Capital Project 1021

CP1021 Environmental Constraints Report

May 2022

EirGrid

Capital Project 1021

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Contents

Glossary and Abbreviations

Abbreviations	
ACA	Architectural Conservation Areas
AAP	Areas of Archaeological Potential
AEOS	Agri Environmental Options Scheme
AIS	Air insulated
ASI	Archaeological Survey of Ireland
CAFE	Cleaner Air for Europe
CFRAM	Catchment Flood Risk Assessment and Management
CPD	County Development Plan
CSO	Central Statistics Office
EHV	Extra High Voltage
EPA	Environmental Protection Agency
GIS	Geographic Information System
GSI	Geological Survey Ireland
HDD	Horizontal Directional Drilling
IGHS	Irish Geological Heritage Sites
i-WeBS	Irish Wetland Bird Survey
LCA	Landscape Character Area
MVAr	Mega Volt Amps (reactive)
MCA	Multi-Criteria Analysis
NIAH	National Inventory of Architectural Heritage
NHA/ pNHA	Natural Heritage Area/ Proposed Natural Heritage Area
NPWS	National Parks and Wildlife Services
OHL	Overhead Line
OPW	Office of Public Works
PWS	Public Water Supply
RMP	Record of Monuments and Places
RPS	Records of Protected Structures
RBMP	River Basin Management Plan
SAC	Special Area of Conservation, designated under the EU Habitats Directive
SI	Statutory Instrument
SMR	Sites and Monuments Record
SPA	Special Protection Area, designated under the EU Birds Directive
TPC	Total Project Cost
TSO	Transmission System Operator
TSSPS	Transmission System Security and Planning Standards
UGC	Underground cable
WFD	Water Framework Directive
XLPE	Cross-linked polyethylene

Executive Summary

Capital Project 1021 (CP 1021) is a Proposed Project that will reinforce the electricity network between East Meath and North Dublin.

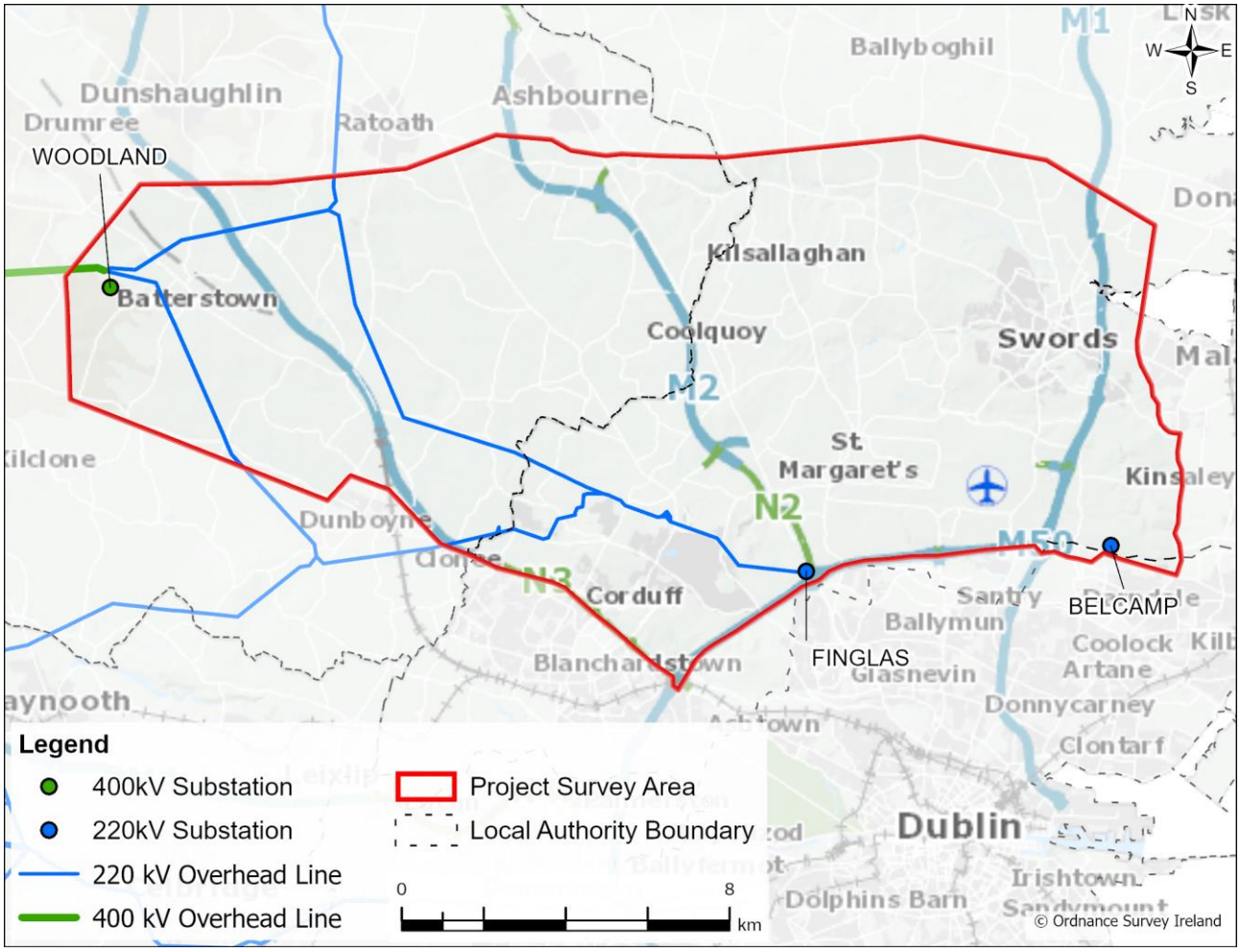

Figure EX-1 Project Study Area

The four solution options being considered for this proposed project are as follows:

- Solution Option 1: New 400kV Overhead Line (OHL) between the existing Finglas and Woodland substations; or
- Solution Option 2: New 400kV Underground Cable (UGC) between the existing Finglas and Woodland substations:
  - Option 2A: One 400kV circuit of standard cable type (2.5m^2 Copper (Cu) cross-linked polyethylene (XLPE) installed in flat formation in a 1.7m wide trench); or
  - Option 2B: One 400kV circuit of alternative cable type (3m^2 Cu XLPE installed in flat formation in a 2.1m wide trench); or
  - Option 2C: Two 400kV circuits consisting of one 2.5m^2 Aluminium (Al) XLPE cable per phase, installed as two circuits in trefoil formation in a single 1700 mm wide trench.
- Solution Option 3: New 400kV OHL between the existing Belcamp and Woodland substations; or
- Solution Option 4: New 400kV UGC between the existing Belcamp and Woodland substations:

- Option 4A: One 400kV circuit of standard cable type (2.5m^2 Cu XLPE installed in flat formation in a 1.7m wide trench); or
- Option 4B: One 400kV circuit of alternative cable type (3m^2 Cu XLPE installed in flat formation in a 2.1m wide trench); or
- Option 4C: Two 400kV circuits consisting of one 2.5m^2 Al XLPE cable per phase, installed as two circuits in trefoil formation in a single 1700 mm wide trench.

This Environmental Constraints Report has been prepared to identify the environmental constraints that should be considered for the proposed project. As part of this assessment, a Project Study Area has been developed. This area identifies where the options for the proposed project may be located. The environmental constraints within the Project Study Area have been categorised based on EirGrid's standard scale along a range from "more significant"/ "more difficult"/ "more risk" to "less significant"/"less difficult"/"less risk".

More Significant/ Difficult/ Risk Less Significant/ Difficult / Risk

Overview of the Project Study Area

Constraints have been identified under relevant environmental topics in order to determine an optimum technical solution and to help determine the most appropriate location. The constraints are considered under the following topic headings:

- Biodiversity(Flora and Fauna);
- Soils and Water;
- Material Assets – Planning Policy and Land Use;
- Landscape and Visual;
- Cultural Heritage (Archaeological and Architectural Heritage); and
- Noise and Vibration.

A separate Strategic Social Impact Assessment Scoping Report (321084AJ-REP-005) will address socio-economic issues.

<u>Biodiversity</u>

There is one Special Areas of Conservation (SAC) and one Special Protection Area (SPA) in the Project Study Area, namely the Malahide Estuary SAC and SPA. The Project Study Area is also hydrologically linked to seven other European sites and three Ramsar sites. In addition to the formally designated sites there are two proposed Natural Heritage Areas (pNHAs) and various habitats with potential to support protected species within the Project Study Area. Habitats present include woodland, grasslands, agricultural land, wetlands and hedgerows/tree lines. There is the supporting habitat within the Project Study Area for several bird species which are the Special Conservation Interests (SCIs) of European sites.

<u>Soils and Water</u>

The Project Study Area is mainly comprised of soils containing fine loamy drift with limestones, with some areas of fine loamy drift with siliceous stones to the east and north-west of Swords. There are significant urban (manmade) areas, particularly at Dublin Airport and Swords.

The main subsoil type in this Project Study Area is limestone till (carboniferous), including the area at Belcamp substation. The subsoils at Woodland substation are mainly comprised of shale and sandstone till (Namurian). There are also some small pockets of limestone sands and gravels, alluvium, and bedrock at surface, particularly in the vicinity of Huntstown Quarry (located to the north-west of Finglas substation), and a small area of sandstone at Malahide Estuary.

There are two Geological Heritage Sites within the Project Study Area; Huntstown Quarry to the immediate west of the N2 National Road and Feltrim Quarry to the south of Swords.

There are four groundwater bodies in the Project Study Area. The majority of the Project Study Area (including Woodland substation) is a 'Locally Important Aquifer' with bedrock that is 'Moderately Productive only in Local Zones. There are also some areas of 'Poor Aquifer' with bedrock that is 'Generally Unproductive except for Local Zones' in the south and eastern sections of the Project Study Area, including at Finglas and Belcamp substations. The Project Study Area mainly comprises low vulnerability aquifer to the west (including Woodland substation) and smaller areas to the east (including Belcamp substation). There is a mixture of Moderate, High and Extreme vulnerability aquifer, and Rock Near or at Surface in the central section of the Project Study Area.

The Project Study Area straddles the 'Liffey and Dublin Bay catchment 09' to the south, and 'catchment 08 Nanny-Delvin' to the north. Woodland substation is located within sub-catchment 09_10 Tolka_SC_010 and Belcamp substation is located within sub catchment 09_17 Mayne_SC_010. Within the Study Area, there are 20 surface waterbodies present. It is important to note the pressures on surface waterbodies in the Project Study Area, with the majority being classified as 'Poor' status and 'At Risk' of failing to meet Water Framework Directive objectives. One surface waterbodies within the Project Study Area is designated as an SAC; Malahide Estuary. In addition, five of the 20 surface waterbodies are hydrologically connected to this or other SACs, including the Broadmeadow_040, Gaybrook_010, Turvey_010, Sluice_010 and Mayne_010.

Fluvial flooding may be an issue in some areas of the Project Study Area. There are some small pockets of areas at risk of pluvial flooding scattered across the Project Study Area. There is also a risk of coastal flooding in the north-eastern section of the Project Study Area in the vicinity of Malahide Estuary.

There is no indication of historic fluvial or pluvial flooding at the Woodland substation and its immediate surrounding area. The Tolka_020 which is approximately 500m from Woodland substation is at risk of flooding. There is some indication of pluvial flooding c. 500 m west of Woodland substation. There is a risk of pluvial flooding in the immediate vicinity of the Finglas substation, on its western boundary. There is no indication of historic fluvial or pluvial flooding at the Belcamp substation. However, the Mayne_010 which is located to the immediate south of the Belcamp substation (approximately 150m) is at risk of flooding. There is also some indication of pluvial flooding to the north of Belcamp substation (approximately 200m to 500m).

Planning Policy

The Project Study Area includes large parts of Meath CC and Fingal CC and a small part of Dublin CC local authority areas. Situated on the outskirts of Dublin and including significant transport networks and interchanges, including two three motorways, a railway and an International Airport, the Project Study Area is subject to a large number of planning policies relating to economic growth, new housing and the infrastructure required to deliver those, including electricity transmission infrastructure. There are numerous proposed developments in the planning system including some Significant Infrastructure Developments and Strategic Housing Developments. These present a significant physical constraint to the development of the infrastructure required to support them. This is particularly the case in the south of the Study Area. In addition, there are biodiversity sites of international and national importance subject to protection through planning policies and objectives.

Land Use

The majority of the Project Study Area is comprised of pastures and non-irrigated arable land. The land use surrounding the areas of Blanchardstown, Finglas, Dublin Airport and Swords becomes more urban in nature.

There is a mix of industrial or commercial units, discontinuous urban fabric and construction sites around Blanchardstown and Finglas to the south and Swords to the north-east of the Project Study Area.

The land use immediately surrounding Woodland substation is pastures, with a pocket of non-irrigated arable land approximately 1.3km to the south-east. There is no forestry or any peat/ bogs present. The Trim Road is about 750m from Woodland substation. The land use immediately surrounding Finglas substation is road and rail networks and associated land. There is some pasture land use to the immediate west of the substation, non-irrigated arable land use to the east of the N2 National Road corridor and complex cultivation patterns to the immediate north. There is also a mineral extraction site associated with Huntstown Quarry to the north-west of Finglas substation. The land use immediately surrounding Belcamp substation is non-irrigated arable land and pastures. The R139 Regional Road is immediately to the south of the substation. There is also a railway crossing of the Dublin to Maynooth railway line in the west of the Project Study Area in the vicinity of Dunboyne. Dublin Airport is also located in the Project Study Area to the north-west of Belcamp substation.

Landscape and Visual

The majority of the western half of the Project Study Area is located in Lowlands, including the South East Lowlands Landscape Character Area (LCA) at Woodland and surrounds and the Ward Lowlands LCA to the east of Woodland. The landscape of the South East Lowlands LCA is dominated by small fields, bounded by mature hedgerows, with clusters of woodland. Moving east, the predominant feature is Low Lying Agricultural LCA at Finglas and Belcamp substations and their surrounds. The north-eastern section of the Project Study Area comprises Rolling Hills with Tree Belts LCA, with a smaller section of River Valleys/Canal LCA to the south-west.

The Meath County Development Plan has assigned the South East Lowlands as Very High Value and Moderate Sensitivity, Tara Skyrne as Exceptional Value and High Sensitivity, the Royal Canal as High Value and Moderate Sensitivity, and the Ward Lowlands as Low Value and High Sensitivity. The Fingal Development Plan has assigned Low Lying Agricultural LCAs as Modest Value and Low Sensitivity, Rolling Hills LCAs as Modest Value and Medium Sensitivity, and the River Valleys/Canal LCA as High Value and High Sensitivity. These landscapes can absorb a certain amount of development once the scale and forms are kept simple and surrounded by adequate screen boundaries and appropriate landscaping to reduce impact on the rural character of the surrounding roads. Particular parts of high sensitivity areas have a low capacity to absorb new development.

There are a number of scenic routes and viewpoints, notably around Malahide Estuary to the north-east of the Project Study Area. The Project Study Area becomes more built up and urban in nature and is more densely populated further to the east.

Cultural Heritage (Archaeological and Architectural Heritage)

The Woodland, Finglas and Belcamp substations are not directly situated on any features of cultural heritage importance. There are no World Heritage Sites in the Project Study Area but there are a number of cultural heritage assets (architectural and archaeological) spread widely across the Project Study Area including National Inventory of Architectural Heritage (NIAH), Record of Protected Structures (RPS) sites, Areas of Archaeological Potential (AAPs) and National Monuments, with clusters concentrated around settlement areas including Batterstown, Dunboyne, Mulhuddart / Clonee, St. Margaret's and Swords.

There are two Architectural Conservation Areas (ACAs) in the Project Study Area and both are within Fingal. The Abbeville ACA is located in the north of the Project Study Area and the Rowlestown ACA is located in the east of the Project Study Area, to the north-east of Dublin Airport. There are two NIAHs to the immediate south-west of Belcamp substation (approximately 105m). There is one NIAH directly to the west of Belcamp substation, a detached three-bay, two-storey house which was damaged by fire. There is also one Designed Landscape to the immediate west of Belcamp substation that surrounds the NIAH. There is also a cluster of AAPs to the north of Belcamp substation and one AAP (a Drumlin) located directly to the north of Finglas substation.

Noise and Vibration

Noise pollution is considered to have a greater impact at certain locations and certain building types are considered to be more sensitive than others (i.e. residential properties, schools, hospitals and residential care facilities). There are a number of these facilities across the Project Study Area and the area includes the M3 Motorway / N3 National Road and the M2 Motorway / N2 National Road to the east of Woodland substation, the M50 Motorway to the south of the Project Study Area, the M1 Motorway to the west of Belcamp substation, and Dublin Airport, for which flight paths pass over the Project Study Area.

At Woodland substation, the nearest sensitive receptors are residential properties to the south and east, approximately 1km to 2km in distance, respectively. As this area is more rural in nature, it would be more susceptible to noise impacts. There is no current noise monitoring in the vicinity of Woodland substation. At Finglas substation, the nearest residential properties to the north are approximately less than 200m from the substation. However, this area is dominated by noise from the M50 Motorway directly to the south and the N2 National Road directly to the east, and from aircraft taking off from or landing into Dublin Airport which is located to the north-east.

Climate Change

The Status of Ireland's Climate 2020 was published in August 2021 (EPA) and sets out the current status of emissions of greenhouse gases and aerosols and changes in rainfall, air temperature, sea levels, ocean acidity and sea surface temperatures. Greenhouse gas emissions have been on an increasing trajectory since pre-Industrial levels and have risen more sharply since the last status update of Ireland's climate in 2012; overall electricity emissions reduced by a third between 2005 and 2018. Rainfall was 6% higher in the period 1989 to 2018 compared to the 30-year period 1961 to 1990. The decade 2006 to 2015 was the wettest on record; fifteen of the top 20 warmest years on record have occurred since 1990; and sea level around Ireland has risen by approximately 2-3mm per year since the early 1990s.

Combined Assessment

The appraisal of each of the solution options is summarised in Table EX-1. From an environmental perspective, the highest risk solution option is Option 2, the OHL to Belcamp. This presents the highest risk to the greatest number of environmental aspects.

Table EX-1: Options Assessment Summary

Topic	Solution Option 1	Solution Option 2	Solution Option 3	Solution Option 4
Biodiversity				
Soil and Water				
Land Use (and Planning)				
Landscape and Visual				
Cultural Heritage				
Noise and Vibration				
Climate Change				
Overall Summary				

Heat Mapping

To map the environmental constraints within the Project Study Area, GIS heatmapping analysis has been used. This involved two steps, initial data preparation and then a weighted overlay.

Initial preparation involved using professional judgement and EirGrid methodologies to assign each constraint a risk category in accordance with the EirGrid colour code for options appraisal and a distance buffer. The buffer distances applied reflect the potential level of risk / significance / sensitivity associated with each constraint.

Separate heatmaps were prepared for the UGC and OHL Solution Options as constraints are different for each. These are presented overleaf in Figures EX-2 and EX-3.

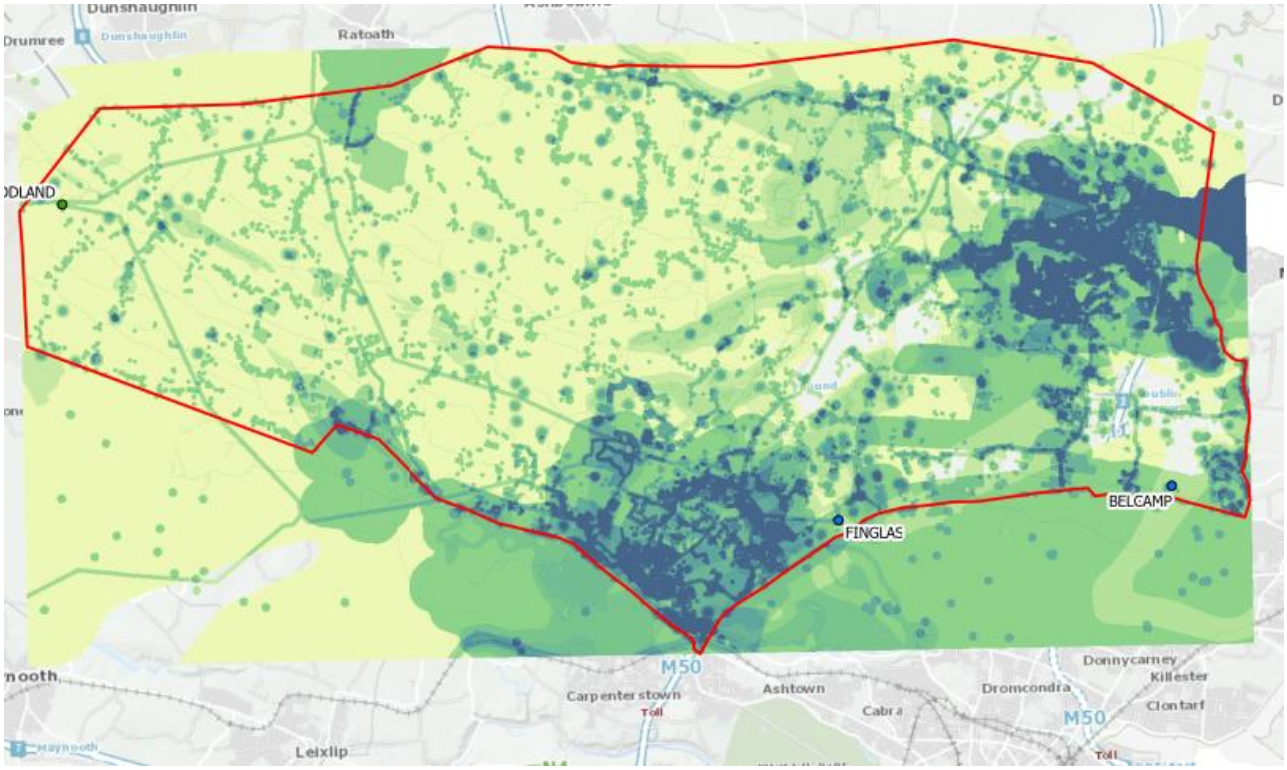

Figure EX-2 OHL Heat Map

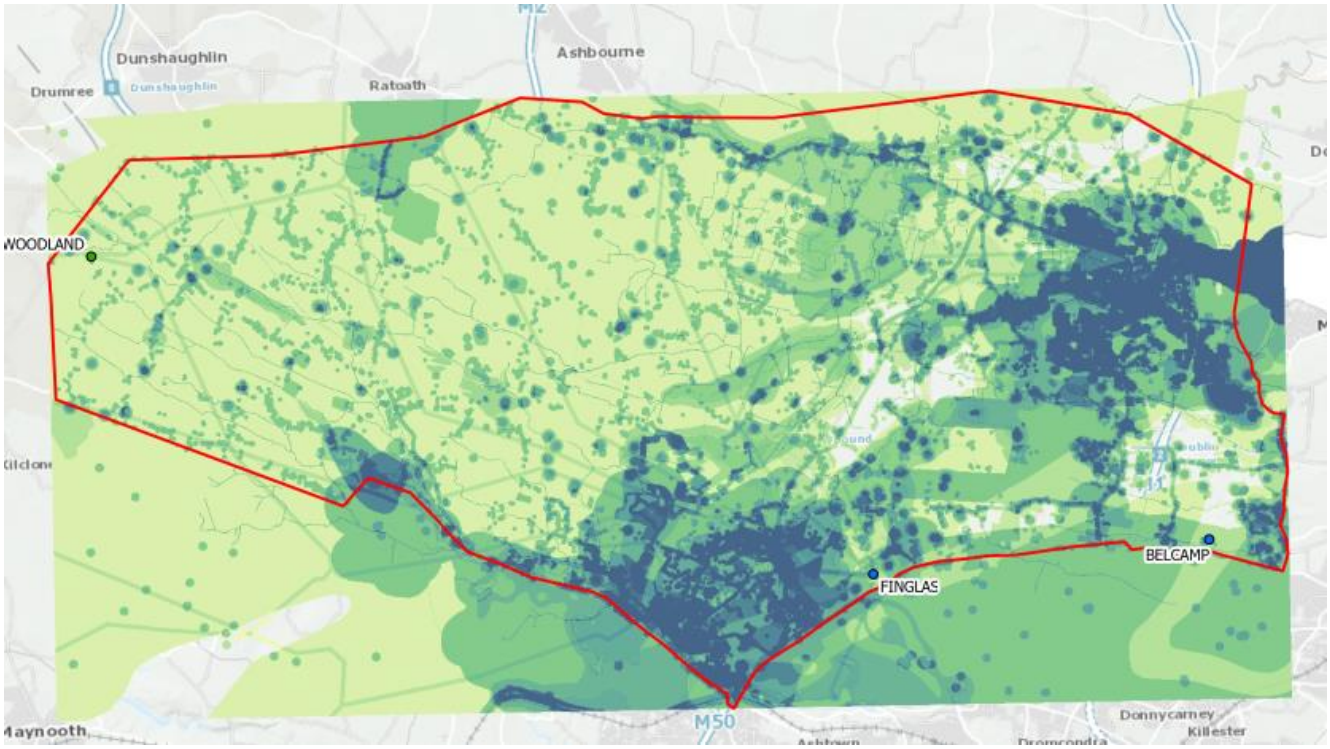

Figure EX-3 UGC Heat Map

1. Introduction

1.1 What is Capital Project 1021?

Capital Project 1021 (CP1021) is a Proposed Project that reinforce the electricity network between East Meath and North Dublin. Further details are provided in the Proposed Project Overview Report (321084AJ-REP-001) along with more information explain EirGrid's approach to Grid Development.

The four solution options being considered for this proposed development are as follows:

- Solution Option 1: New 400kV Overhead Line (OHL) between the existing Finglas and Woodland substations; or
- Solution Option 2: New 400kV Underground Cable (UGC) between the existing Finglas and Woodland substations:
- Solution Option 3: New 400kV OHL between the existing Belcamp and Woodland substations; or
- Solution Option 4: New 400kV UGC between the existing Belcamp and Woodland substations:

There are sub-options for Solution Option 2 and Solution Option 4, which comprise of the following:

- Option 2A / 4A: One 400kV circuit of standard cable type (2,500mm2 Cu XLPE installed in flat formation in a 1.7m wide trench);or
- Option 2B / 4B: One 400kV circuit alternative cable type (3,000mm2 Cu XLPE installed in flat formation in a 2.1m wide trench); or
- Option 2C / 4C: Two 400kV 2,500m^2 Al XLPE cables per phase, installed in trefoil formation in a single 1.7m wide trench..

1.2 Aims and Contents of the Environmental Constraints Report

EirGrid has engaged Jacobs to assess the environmental constraints that should be taken into account for the Proposed Project. This Report is aimed at presenting the findings of this investigation. The finding will feed into EirGrid's overall evaluation of the solution options.

In particular, the purpose of this Report is to:

- Define a study area that reflects the expected construction and operational footprint for all of the solution options and the potential distance over which environmental impacts could occur during the construction or operation of these solutions (see Section 2.1);
- Identify and describe the types of environmental constraints that are most likely to be affected by the construction and operation of EirGrid's Best Performing Option (see Section 4), in line with the approach to the constraints report outlined in Section 3;
- Identify the principal environmental constraints likely to arise during the construction or operation of each of the solutions (See Section 5 to Section 6); and
- Summarise, evaluate and compare the constraints applicable to each of the solutions (See Section 5 to Section 7).

1.3 Environmental Multi-Criteria Assessment

This report describes the environmental constraints within the study Area (s) and includes a Multi-Criteria Assessment (MCA) of environmental criteria in the context of each technical option. This will be combined with

findings from the feasibility studies, Social Impact Assessment and other investigations and feed into a wider MCA being undertaken by EirGrid to identify the best performing option(s).

1.3.1 Scale Used to Assess Each Criterion

The effect on each criterion parameter is presented along a range from "more significant"/ "more difficult"/"more risk" to "less significant"/"less difficult"/"less risk".

The following scale is used to illustrate each criterion parameter:

More Significant/ Difficult/ Risk Less Significant/ Difficult / Risk

This risk scale is clarified by text, as follows:

- High: dark blue;
- Moderate-high: blue;
- Moderate: dark green;
- Low-moderate: green; and
- Low: cream.

1.4 Relationship to other Technical Reports

Parallel to this Report, technical studies are being prepared to investigate the feasibility of the options.

Jacobs has prepared the following reports for the Proposed Project:

- CP1021 Cable Route Feasibility Report (321084AJ-REP-002);
- CP1021 OHL Feasibility Report (321084AJ-REP-003);
- CP1021 Strategic Social Impact Assessment Scoping Report (321084AJ-REP-005); and
- CP1021 Substation Feasibility Report (321084AJ-REP-006).

This Report (the Environmental Constraints Report) for the Proposed Project has the reference 321084AJ-REP-004.

2. The Proposed Project

2.1 Study Areas

2.1.1 Proposed Project Study Area

The Proposed Project Study Area (hereafter referred to as the Project Study Area) is defined as the area investigated for the possible installation of the technologies identified and shortlisted in Step 2 and listed in Section 1.1 of this report. See Figure 2-1. Further information about the development of the Project Study Area, and other smaller sub-study areas, is provided in the Proposed Project Overview Report.

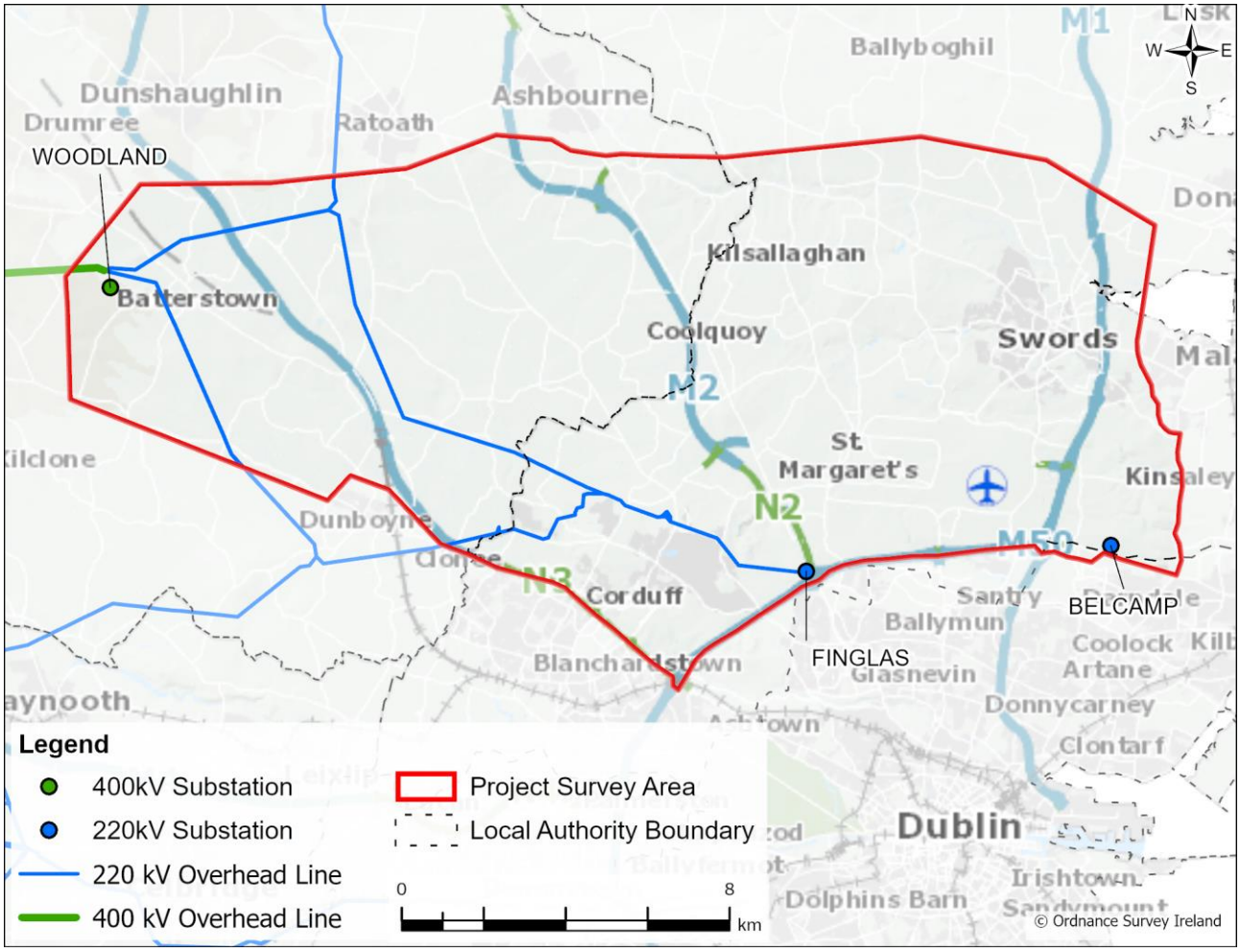

Figure 2-1: Project Study Area at Step 3

The Project Study Area is not, however, precisely congruent with the environmental assessment Study Area, which has some flexibility in terms of potential environmental constraints; where a wider perspective is often needed, for example in terms of birds' flight paths or hydrological connections to internationally designated habitats outside of the Project Study Area. The assessment of the Technological Solutions will cover all likely significant environmental impacts whether they occur inside the Project Study Area or outside of it.

2.1.2 Finglas Study Area (Solution Options 1 and 2)

A smaller Study Area has been defined for potential connections to Finglas substation. This is because, taking the overarching principles of taking the shortest, straightest route (OHL and UGC) and using public highways where possible (for UGC), land to the north and east of Dublin Airport can be excluded. See **Figure 2-2**.

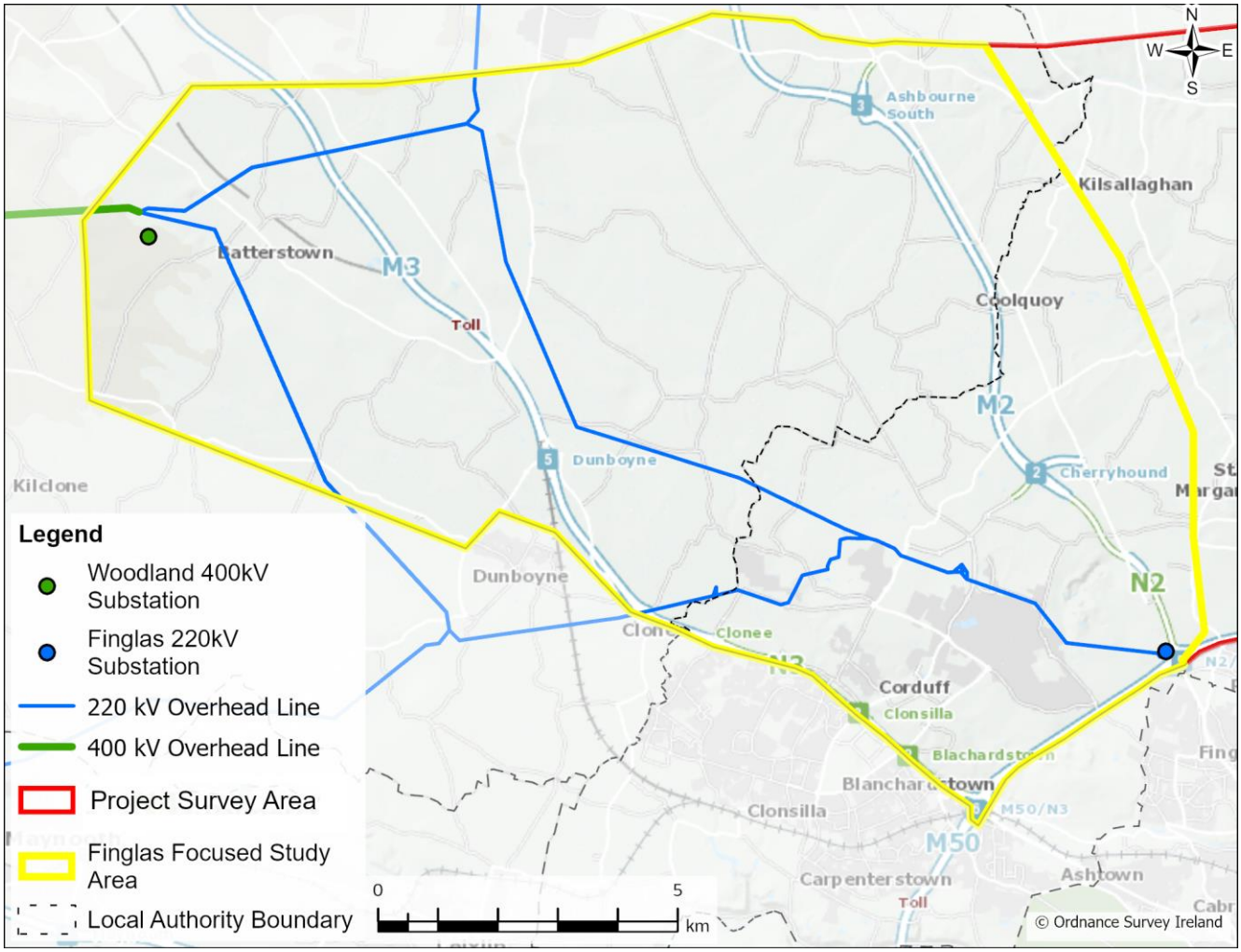

Figure 2-2 Finglas Study Area

2.1.3 Belcamp Study Area (Solution Options 3 and 4)

The Project Study Area was primarily defined to the north and east to facilitate feasible connections to Belcamp; there is also potential for connections to Belcamp to come south from Woodland then travel east. As a result, the Belcamp Study Area is the same as the Project Study Area (See Figure 2-1).

3. Approach to Constraints Report

3.1 Introduction

This Section of the Report sets out the approach to identifying the specific constraints present in the Study Areas for each solution option, including their mapping, and describes the methodology used to create a 'Heatmap' which presents a combined map of key constraints as a single visual image.

3.2 Preparation of Constraints Report

3.2.1 Information Gathering

The constraints identified are, in general, based on a review of publicly available datasets. The following County Development Plan (CDP) and Local Area Plans and mapping were reviewed.

- Meath County Council (MCC) Meath County Development Plan 2021 – 2027 (https://consult.meath.ie/en/consultation/meath-adopted-county-development-plan); and
- Fingal County Council (FCC) Fingal Development Plan 2017 – 2023 (https://www.fingal.ie/fingal-development-plan-2017-2023).

The following online resources were also referenced between September 2021 and December 2021 to inform this Report:

- Project Related Documents (http://www.eirgridgroup.com/the-grid/projects/cp1021/the-project/);
- EirGrid environmental guidance including Ecology Guidelines for Electricity Transmission Projects (http://www.eirgridgroup.com/site-files/library/EirGrid/Ecology-Guidelines-for-Electricity-Transmission-Projects.pdf), Cultural Heritage Guidelines for Electricity Transmission Projects, and EirGrid's Evidence-Based Environmental Studies (https://www.eirgridgroup.com/about/in-the-community/environment/environmental-impact/index.xml)
- Myplan.ie Mapping (http://www.myplan.ie/webapp);
- Central Statistics Office, CSO (http://census.cso.ie/sapmap);
- Data.gov.ie (https://data.gov.ie/dataset);
- National Parks and Wildlife Services, NPWS (https://www.npws.ie);
- National Biodiversity Data Centre (https://maps.biodiversityireland.ie);
- Irish Ramsar Wetland Committee (http://www.irishwetlands.ie);
- Environmental Protection Agency (EPA) mapping (https://gis.epa.ie/EPAMaps/AAGeoTool);
- Geological Survey Ireland, GSI (https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx);
- National Monuments Service (https://www.archaeology.ie);
- National Inventory of Archaeological Heritage (http://www.buildingsofireland.ie);
- Heritage Mapping (https://www.heritagemaps.ie/WebApps/HeritageMaps/index.html);
- GeoHive (http://map.geohive.ie/mapviewer.html);
- Irish Wetland Bird Survey, i-WeBS (https://www.birdwatchireland.ie/?tabid=111);
- The Karst of Ireland (GSI, Geological Survey Ireland, International Association of Hydrologists, Irish Association of Economic Geology, 2000, https://www.gsi.ie/enie/publications/Pages/The-Karst-of-Ireland.aspx)

All sources and references are listed at the end of this Report.

3.2.2 GIS Constraints Mapping

Geographic Information System (GIS) mapping has been used to display the key datasets that inform this Report. The constraints maps for key constraints are presented in Appendix A of this Report or, where appropriate, embedded within the text for a topic.

Datasets

GIS datasets were collated from a variety of sources including direct data downloads from open source authority sites. A number of datasets were already held or gathered by Jacobs and these were checked as appropriate to ensure they were up to date and a copy was imported into the Proposed Project databases.

All data licenses were checked to ensure they were available for use. Each dataset then went through a technical check to ensure they were complete, correct and relevant. The data sourced for constraints mapping is detailed in Appendix B.

3.3 Heat Mapping

3.3.1 Overview of Heat Mapping Method

GIS heatmapping analysis involved two steps, initial data preparation and then a weighted overlay.

Initial preparation involved using professional judgement and EirGrid methodologies to assign each constraint a risk category (weighting) in accordance with the EirGrid colour code for options appraisal (see below). There are five risk ratings which range from 'more significant / difficult risks to 'less significant / difficult risks. A buffer will also be applied to each constraint and will vary depending on the nature of each constraint. However, the buffer distances applied will generally reflect the potential level of risk / significance / sensitivity associated with each constraint. These are presented alongside the risk for each constraint in Table 3.1.

A separate Heat Map has been prepared for the UGC and the OHL technologies; for may constraints, the risks are similar for each technology, however for some the risks are quite different.

A weighted overlay tool, which calculates statistics relative to weightings and the overlap of constraints, was then used to construct the Heatmaps, which are presented in Appendix C.

All data was thoroughly checked by GIS specialists and converted to the appropriate co-ordinate system prior to use.

More Significant/ Difficult/ Risk — Less Significant/ Difficult / Risk

This risk scale is clarified by text, as follows:

- High: dark blue;
- Moderate-high: blue;
- Moderate: dark green;
- Low-moderate: green; and
- Low: cream.

Table 3.1: Constraints Used in Heat mapping and Risk Assigned

Environmental Topic	Constraint / Designation Type	OHL Buffer (m)	OHL Risk	UGC Buffer (m)	UGC Risk
Biodiversity	SAC	200	High	200	High
	SPA	200	High	200	High
	RAMSAR	200		200	
	Ancient or Long Established Woodland	100	High	100	High
	Native Woodland	100	Moderate-High	100	Moderate-High
Cultural Heritage	NIAH	100	Moderate	100	Moderate-High
	SMR	100	Moderate	100	Moderate-High
	National Monuments	200	High	200	High
Land use	CORINE landcover - Forestry	100	Low-Moderate	100	Low-Moderate
	County Development Plan - Land Use Zoning - Town Centre	500	High	1	Low-Moderate
Surface Water	WFD Water bodies High Status	10	Low-Moderate	50	High
	WFD Water bodies Good Status	10	Low-Moderate	10	High
	WFD Water bodies Moderate Status	10	Low-Moderate	10	Moderate-High
	WFD Water bodies Poor Status	10	Low-Moderate	10	Moderate
	WFD Water bodies Bad Status	10	Low-Moderate	10	Low
	WFD Water bodies Unassigned Status (assume Good)	10	Low-Moderate	10	High
	Flood Risk Areas	50	Moderate-High	1	Low-Moderate
Groundwater	Public & Group Supply Source Protection Area (Inner & Outer)	1	Moderate	100	Moderate-High
	Group Water Schemes	1	Moderate	100	Moderate-High
	Regionally Important Aquifers (RK, Rf, Rg)	1	Moderate	100	Moderate-High
	Locally Important Aquifers (Lg, Lm, Lk, Li)	1	Low-Moderate	50	Moderate
Soils & Geology	Peat (subsoils)	100	Moderate-High	100	Moderate-High
	Abandoned Mines	200	Moderate-High	200	Moderate-High
	Quarries	50	Moderate-High	50	Moderate-High
	Karst Landforms	100	Moderate-High	100	Moderate-High
	Geological Heritage Sites	200	Moderate-High	200	Moderate-High
	Landslide Susceptibility	100	High	100	High
Material Assets	Existing overhead lines (400 kV)	50	High	1	High
	Existing overhead lines (220 kV)	50	High	1	Moderate-High
	Existing overhead lines (110 kV)	50	Low-Moderate	1	Low-Moderate
	Gas networks	50	High	50	High
Socio-Economic	Residential Properties	50	High	1	High
Essential Infrastructure	International Airport	100	High	30	High
	Reservoir	50	Moderate-High	50	Moderate-High
	Water Treatment Plant	1	Moderate	1	Moderate
	Wastewater Treatment Plant	1	Moderate	1	Moderate
	Electricity Substations (400, 220 and 110 kV)	1	High	1	High
	Major tourism sites	500	High	1	High
	Local Roads	1	Low	1	Low-Moderate
	Regional Roads	1	Low	1	Low
	National Roads	1	Moderate-High	1	High
	Motorways	1	Moderate-High	1	High
	Settlements	1	High	1	High
EPA Sites	Licenced facilities IE	1	Moderate	1	Moderate
	Licenced facilities IPC	1	Moderate	1	Moderate
	Licenced facilities Waste	1	Moderate	1	Moderate

3.3.2 Heat Map Output

The resultant Heat Maps are presented in Appendix C of this Report.

4. Environmental Constraints Considered

4.1 Introduction

This Section of the Report introduces the environmental constraints that have been considered, and organises them under particular environmental topics, to aid understanding and presentation of the assessment findings. These topics have been selected as they are the most likely to represent the key considerations, constraints, risks and opportunities for the proposed project.

Only environmental constraints are described in this Report. Socio-economic constraints (i.e. receptors relating to people and communities) are described in the Strategic Social Impact Assessment Scoping Report (321084AJ-REP-005). It is acknowledged that there is potential for environmental issues to result in social impacts. This is particularly the case for potential impacts on the amenity of local communities which could be adversely affected by a combination of noise, air quality, visual amenity and traffic impacts. Air Quality has been scoped out of the assessment of the options; there are no air quality impacts from either OHL or UGC during operation; in construction, potential impacts would be managed using Industry Standard Best Practice Measures (as set out by the Institute of Air Quality Management (IAQM, 2014). Noise and visual impacts are considered in this report; traffic and transport, and the combined amenity impacts, from these topics, are considered in the Strategic SIA Scoping Report.

The national picture for Ireland is presented in this section (Section 3) to give the overall context for the choice of the constraints and their associated topics. Section 5.2 and Section 6.2 describe the baselines for each environmental topic in relation to the Study Area(s) for each of the solution options, while also considering the key issues and potential impacts of each solution option in respect to each environmental topic, and subsequently present a high-level assessment of the environmental performance of each solution option, using EirGrid's MCA colour codes to illustrate the findings (see Section 1.3 for information on EirGrid's MCA process).

4.2 Environmental Topics

The environmental constraints have been organised into the following topics:

- Biodiversity, (Flora and Fauna);
- Soils and Water;
- Material Assets –Planning Policy and Land Use;
- Landscape and Visual;
- Cultural Heritage (Archaeological and Architectural Heritage);
- Noise and Vibration; and
- Climate Change.

4.2.1 Biodiversity, Flora & Fauna

In 1997, the Habitats Directive (92/43/EEC) was transposed into Irish law by the European Communities (Natural Habitats) Regulations, S.I. 94 of 1997 as amended. The Regulations were subsequently revised and consolidated in the European Communities (Birds and Natural Habitats) Regulations 2011, S.I. 477 of 2011, as amended. The main purpose of the Directive is to ensure the appropriate conservation of natural habitats and wild fauna and flora. Under the Directive, Member States like Ireland were required to establish an ecological network of SACs (sites which host a range of natural habitats and species listed in Annex I and II of the Directive) and SPAs as designated under the Birds Directive (2009/147/EC).

On a national level, Natural Heritage Areas (NHAs) are areas considered important for their habitats or species of plants and animals whose habitat needs protection. NHAs are designated under the Wildlife (Amendment) Act

2000. They include a large number of raised bogs and blanket bogs, as well as woodlands, lakes, landforms and geological features. In addition, there are a total of 1089 proposed NHAs (pNHAs) in Ireland. These were published on a non-statutory basis but have not been statutorily proposed or designated. These sites vary significantly in size.[i]

Prior to statutory designation, pNHAs are subject to limited protection, in the form of:

- Agri-environmental farm planning schemes such as the Green Low Carbon Agri-Environment (GLAS) scheme continue to support the objective of maintaining and enhancing the conservation status of pNHAs;
- Forest Service requirement for NPWS approval before they will pay afforestation grants on pNHA lands; and
- Recognition of the ecological value of pNHAs by Planning and Licensing Authorities.

Nature Reserves are also important to wildlife, and these are protected under Ministerial order. Most are owned by the State, but some are owned by organisations or private landowners. There are no nature reserves within the Project Study Area with the nearest site being Baldoyle Estuary Nature Reserve. Most are owned by the State, but some are owned by organisations or private landowners.

Other protected sites that are nationally important for birds include Wildfowl Sanctuaries and Refuges for Fauna. However, there are no such sites within the Project Study Area.

There is also a wide range of important habitats in Ireland which are not within sites for nature conservation. For example, the Project Study Area includes ancient woodland, native woodland, bogs and semi-natural grasslands outwith designated sites.

4.2.2 Soils and Water Impacts

Geology and Soils

As part of the Irish Geological Heritage (IGH) Programme, a partnership between the Geological Survey of Ireland (2017) and the NPWS, the Geological Survey of Ireland has identified important geological and geomorphological sites which could be conserved as NHAs. Until designation is confirmed, these sites are classified as Irish Geological Heritage Sites (IGHSs). There are over 900 IGHSs identified around Ireland.

The main rock type in Ireland is carboniferous limestone, which covers approximately 50% of Ireland in the low-lying centre of the country.

There is no legislation solely directed to soil protection in Ireland. In 2006, the European Commission developed a Soil Thematic Strategy that aims to protect soils and ensure the sustainable use of soils across Europe.

Soil quality in Ireland is generally of good quality. Brown fertile earth, which is quite shallow, makes up most of the soil formation and is mostly found in the midlands and eastern counties. Of Ireland's landmass, 68% is used for agriculture due to this brown earth being rich and fertile. The other large soil type is gley, which is peaty soil, mainly found in the low-lying centre of Ireland. This soil has a large clay composition and is poorly drained. Brown podzolics and grey-brown podzolics also make up a large part of the soil formation of Ireland and are mainly found in the central and southern counties of Ireland. Podzolic soils are typical of the geology and landscape of those areas, typically found on sandy deposits on forested soils (EPA 2012).

Surface Water and Groundwater

The Water Framework Directive (WFD) is one of the key instruments in the protection of water resources. It aims to maintain "High" and "Good" status waters and prevent deterioration in the status for all waterbodies, including rivers, lakes, estuaries, coastal waters and groundwater. The WFD is transposed into Irish law by a number of regulations and amendments where applicable, including:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);

- European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. No. 272 of 2009) (as amended);
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 (as amended)); and
- European Union (Water Policy) Regulations 2014 (S.I. No. 350 of 2014).

The current (and second) River Basin Management Plan (RBMP) for Ireland 2018-2021 (Department of Housing, Planning and Local Government 2018) considers the whole of Ireland as the river basin under consideration. Figure 4-1 is an extract from the RBMP and shows the key statistics for Ireland in terms of the catchments and types of waterbody included; and compliance with EU standards (2015). The current status (2010-2015) of water bodies in the Project Study Area is shown in Sections 5.22, 6.22, 7.22 and 8.22. The RBMP for Ireland is currently being updated with a revised Plan due for publication in early 2022 and it is clear from the consultation draft, published November 2021, that surface water quality is deteriorating in parts of Ireland.

There are five classes of WFD status for surface water bodies and two classes for groundwater bodies, and the status is determined by that of the poorest quality element.

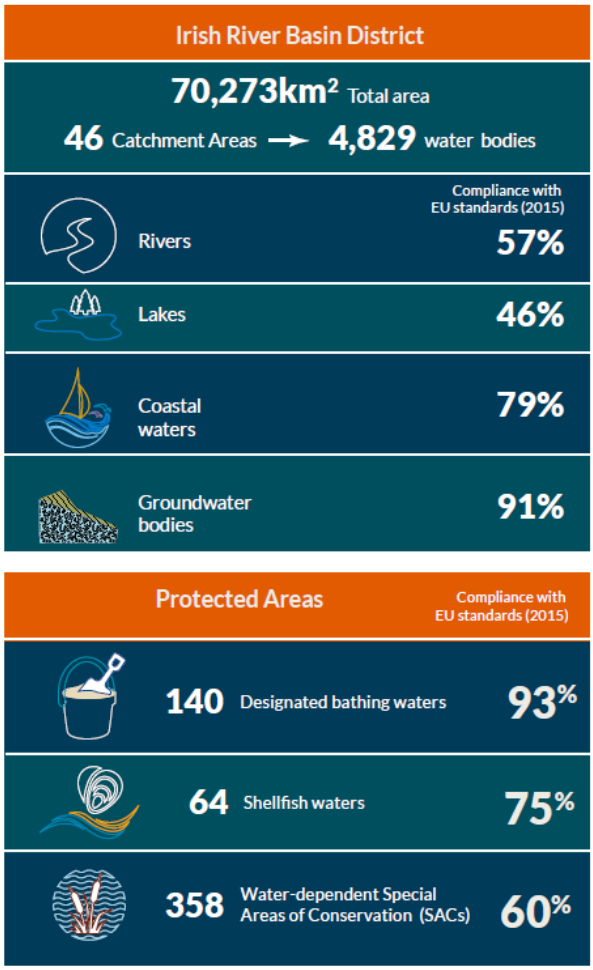

Figure 4-1 Extract from RBMP 2018-2021

Flood Risk

The frequency of flood events in Ireland has been increasing and, with climate change, is expected to increase further. Increased flooding can cause pressure on all infrastructure, including energy infrastructure such as power stations, substations and transmission lines (see Section 5.2.7 Climate Change for more details).

The Floods Directive (2007/60/EC) required member states to develop Flood Risk Management Plans for areas of existing and future potentially significant flood risk. The Floods Directive was transposed into Irish law by the EU (Assessment and Management of Flood Risks) Regulations 2010 and sets out the responsibilities of the Office of Public Works (OPW).

The Office for Public Works (OPW) has been implementing the Directive mainly through the Catchment Flood Risk Assessment and Management (CFRAM) Programme, through which 29 draft Flood Risk Management Plans have been developed. Approximately 300 'Areas for Further Assessment' have been established along with a range of measures to reduce or manage the flood risk within each catchment.

4.2.3 Material Assets –Planning Policy and Land Use

In this report, 'Material Assets' includes Planning Policy, Proposed Developments and Land Use only. Utilities and community impacts are included within the SIA Scoping Report.

Planning Policy and Legislation

The Planning and Development Act 2000 (as amended) forms the foundation for planning in Ireland. It covers a large range of planning-related issues, and combines a wide range of different legislation into one place, including:

- The purpose and content of regional planning guidelines, development plans and local area plans;
- How the process of applying for and obtaining planning permission works;
- Special requirements for protected structures, conservation areas and areas of special planning control;
- Ireland's planning appeals and enforcement processes;
- A description of Strategic Development Zones; and
- A description of the Environmental Impact Assessment (EIA) process and which projects are required to undertake EIA[1].

There have been a number of amendments to the Act since 2000; taken together these are known as the 'Planning and Development Acts'. These Acts are underpinned and implemented by the Planning and Development Regulations 2001 (and amendments). Other National, Regional and Local Planning Policy relevant to the Project Study Area will also be taken into account to identify potential impacts at a national, regional and local level.

At national level, three documents are of particular relevance to the proposed project, the 'National Planning Framework - Project Ireland 2040' (NPF) (Department of Housing, Local Government and Heritage, 2020), Project Ireland- National Development Plan (NDP) 2021-2030 (NDP) (Department of Public Expenditure and Reform, 2021), and the Government Policy Statement on the Strategic Importance of Transmission and Other Energy Infrastructure (Department of Communications, Energy and Natural Resources, July 2012) are all relevant to the proposed project.

The NPF is the Government's high-level strategic plan for shaping the future growth and development of Ireland to the year 2040 and marks the highest tier of Ireland's spatial plans. The NPF identifies County Meath, Fingal and Dublin City as being located in the Eastern and Midland Region, which is expected to see the highest level of social and economic growth in the coming years. This exponential growth is acknowledged within the NPF, which states that a key future planning priority lies in ensuring complimentary development in the Greater Dublin area and Midland areas in a regionally coordinated manner. Implementation of the NPF is focused on policies, actions and investments to deliver 10 National Strategy Outcomes. Of particular relevance is 'National Strategic Outcome 8: Transition to Sustainable Energy' aims to "Reinforce the distribution and transmission network to facilitate planned growth and distribution of a more renewables focused source of energy across the major demand centres". (p. 147)

[1] The Proposed Project has not yet been subject to a screening to determine if an Environmental Impact Assessment (EIA) is required. This will be at a later step in the Proposed Project.

The NDP is the national capital investment strategy plan that is integrated and aligned with the NPF. Its sets out the framework of expenditure commitments to secure the Strategic Investment Priorities to the year 2027 and support the delivery of the ten NSOs identified in the NPF. It sets out a programme of investment that includes indicative Exchequer allocations. Under Section 5.2 the NDP outlines measures to enhance energy efficiency including, "Develop further interconnection to increase energy security and facilitate more variable electricity generation on the grid" (p.77).

In the 'Government Policy Statement on the Strategic Importance of Transmission and Other Energy Infrastructure The Government' recognises the importance of the need for the upgrading and development of the electricity network to meet existing and future energy demands. The Energy Infrastructure Policy fully supports EirGrid's Grid 25 Programme and the investment required. This outlines that the Government "endorses the major investment underway in the high voltage electricity transmission system under EirGrid's Grid 25 Programme." It continues "Grid 25 is the most important investment in Irelands transmission system for several generations and will position out energy system for decades to come" (p.1). The policy reaffirms the Government's position that there is an imperative need for upgrade and renewal of the Irish energy network.

There are also plans at regional, county, and local level that contain relevant policies and objectives for the Study Areas, these are looked at in detail within the within the baseline sections. These objectives and policies may relate to constraints such as land use zoning; biodiversity; flood risk; cultural heritage; landscape designations and landscape character; protection corridors; amenity; and existing and proposed residential land use. These include:

- Regional Spatial and Economic Strategies- statutory documents supporting the implementation of the NPD and NDP, providing a long-term strategic planning and economic framework for the development of the region.
- County Development Plans- Plans setting out a strategic framework for the proper planning and sustainable development of the administrative area of a local authority.
- Local Area Plans- Statutory plans prepared by local planning authorities for urban areas identified as being in need of particular physical, economic or social renewal, or are expected to undergo largescale redevelopment.

There may also be Master Plans that guide development of urban sites in the Study Area, but this is not a level of detail that is appropriate at the current stage.

Land Use and Cover

Land cover describes what is visible on the land surface. Land use describes the use(s) applied to this land from a human perspective. The interactions between human activity, such as farming, forestry and the built environment, are interlinked with processes that shape the environment, landscape and biodiversity of Ireland.

The CORINE (Co-ORdinated INformation on the Environment) data series is used by the EPA in Ireland for reporting on land cover. CORINE was established by the European Community (EC) as a means of compiling geo-spatial land cover and environmental information in a standardised and comparable manner across Europe.

The most recent assessment (CORINE 2018) shows that agriculture is the primary land use / cover type within Ireland (67.6% national land cover), followed by wetlands (14.9%) and forestry (9.5%). The main agricultural class is pasture (55.1% national land cover), followed by land principally occupied by agriculture (primarily pasture), which is spread out with areas of natural vegetation (6.9%), and arable land (4.5%). Peatlands provide a range of functions, including maintaining biodiversity and water quality, carbon storage and sequestration, agriculture, forestry, water regulation, recreation and flood attenuation. Forests provide many functions, including carbon sequestration and storage, water regulation and support for biodiversity, in addition to their commercial value.

In addition to these land uses, there are networks of transport infrastructure throughout Ireland, including:

- 100,000km of road network and 2,400km of railway; and

- There are four international airports in Ireland (Dublin Airport, Cork Airport, Ireland West (Knock) Airport and Shannon Airport) and two (operational) regional airports (Donegal Airport and Kerry Airport). Dublin Airport, the country's largest airport.

4.2.4 Landscape and Visual

The primary legislation for the protection of landscapes in Ireland is the Planning and Development Act (2000) (as amended). Section 10 (2.e) requires County Development Plans to '*preserve the character of the landscape*' where the planning authority considers sustainable development of the area requires it and includes '*the preservation of views and prospects and the amenities of places and features of natural beauty or interest*'.

There is currently no published national level landscape mapping for Ireland. In accordance with the Planning and Development Act 2010, all local authorities need to identify Landscape Character Areas (LCAs) within their Development Plans to ensure that defining features are protected and managed. There is no national classification system for Landscape Character Areas, as these are geographically specific and have their own distinctive character based on their location and surrounding environment.

Both Meath and Fingal County Councils have formally documented their LCAs within their County Development Plans and classified them as Low, Medium and High based on their values and sensitivities. The Meath County Development Plan includes LCA Maps which outline the likely indicative types of development within each LCA.

4.2.5 Cultural Heritage (Archaeological and Architectural Heritage)

Cultural heritage includes archaeology, architectural heritage, folklore and history (EPA 2017). It is a broad term that includes a wide range of tangible and intangible cultural considerations. Cultural heritage can relate to settlements, former designed landscapes, buildings and structures, folklore, townland and place names, and historical events, as well as traditions (e.g. pilgrim ways) and traditional practices (e.g. saints' pattern days).

Cultural heritage assets are valued for the important contribution they make to the understanding of the history of a place, an event or people. Sites of cultural heritage interest are often afforded protection either as recorded archaeological monuments (on the Record of Monuments and Places (RMP) / Sites and Monuments Record (SMR)) or as protected structures (on the Record of Protected Structures (RPS) in the relevant City or County Development Plan), or as structures within the National Inventory of Architectural Heritage (NIAH). There are also National Monuments in the State's guardianship or ownership. A National Monument receives statutory protection and is described as 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto' (National Monuments Act 1930). The State or Local Authority may assume guardianship of any National Monument (other than dwellings).

In Ireland, assets include sites such as prehistoric burial mounds, megalithic tombs, standing stones, urban archaeological deposits and underwater features. Many archaeological sites may have no surviving visible surface features. However, archaeological deposits and features may survive beneath the surface and could potentially be disturbed or destroyed by construction works.

Archaeological sites are legally protected by the provisions of the National Monuments Acts 1930 (as amended), the National Cultural Institutions Act 1997 and the Planning and Development Acts 1963 to 1968 (the 'Planning Acts'). One of the primary sources of information for known archaeological features is the RMP, an inventory of sites and areas of archaeological significance. It holds records of known upstanding archaeological monuments, the original location of destroyed monuments, and the location of possible sites. The Minister for Housing, Local Government and Heritage has specific responsibility for the protection of archaeological heritage.

Architectural heritage includes buildings and structures, their contents and settings and designed landscapes and demesnes which are of artistic, technical, social scientific and cultural interest. Nationally, sites of architectural heritage interest are subject to statutory protection. Section 10 (2)(f) and Section 51 of the Planning and Development Act 2000 places a statutory obligation on local authorities to include sites of architectural heritage

in their development plans and objectives for the protection of structures, or parts of structures, which are of special architectural heritage interest. The principal mechanism for the protection of these structures is through their inclusion on the RPS in the relevant city or county development plan.

The Planning and Development Act also introduced Architectural Conservation Areas (ACAs). An ACA is a place, area, group of structures or townscape that is of special architectural, historical, archaeological, technical, social, cultural, or scientific, interest, or that contributes to the appreciation of a protected structure or group of protected structures. ACAs in Ireland are detailed in the various County and Local Area Development Plans (some of which are pending designation).

4.2.6 Noise and Vibration

The Noise Directive (2002/49/EC), relating to the assessment and management of environmental noise, was transposed into Irish law via the Environmental Noise Regulations 2006 (Statutory Instrument (S.I. No. 140 of 2006)). This Directive called for the development of strategic noise maps and action plans for major roads, railways, airports and cities. To date, these have been produced for the road network only.

The relevant planning authorities are required to prepare noise action plans designed as a means of managing land use planning, traffic management and control of noise sources. The EPA has published guidance for local authorities on the content of the plans.

Baseline noise modelling in Ireland is only carried out along major roads, railway lines and for major airports.

4.2.7 Climate Change

The Status of Ireland's Climate 2020 was published in August 2021 (EPA) and sets out the current status of emissions of greenhouse gases and aerosols and changes in rainfall, air temperature, sea levels, ocean acidity and sea surface temperatures. Ireland's Climate Action Plan 2021 (Government of Ireland November 2021) sets out a roadmap to halve greenhouse gas emissions by 2030 and reach net zero no later than 2050.

Greenhouse Gas Emissions Trends

- Greenhouse gas emissions have been on an increasing trajectory since pre-Industrial levels and have risen more sharply since the last status update of Ireland's climate in 2012;
- Overall electricity emissions reduced by a third between 2005 and 2018, underpinned by the growth of generation from renewables and higher efficiency from conventional generation; and
- The share of electricity from renewable energy increased almost five fold between 2005 and 2018, from 7.2% to 33.7%.

Climate Trends

- Rainfall was 6% higher in the period 1989 to 2018 compared to the 30-year period 1961 to 1990. The decade 2006 to 2015 was the wettest on record;
- Annual average air temperature has risen by approximately 0.9C over the last 120 years. Fifteen of the top 20 warmest years on record have occurred since 1990;
- Sea level around Ireland has risen by approximately 2-3mm per year since the early 1990s;
- Ocean acidity has increased by 0.05pH units between 1991 and 2013;
- Sea surface temperature has risen 0.15C per decade between 1990 and 2020.;
- River flows have increased across most of the country however there is also an increase in potentially drought conditions, especially in the east;
- There has been an increase in forest extent of 30% between 1990 and 2018 and a decrease in wetland areas, including peatlands; and

- The total volume of trees and hence carbon sequestration has increased by 38% between 2006 and 2017.

These changes are acknowledged to be as a result of cumulative emissions of Greenhouse Gases from anthropogenic sources causing global mean surface warming.

The Climate Action Plan has a target to increase the proportion of renewable electricity to up to 80% by 2030. The Plan sets out that additional electricity generation and transmission infrastructure will be a critical enabler to achieve the renewable energy and emissions targets.

In Ireland, total electricity demand over the next ten years is forecast to grow between 19% and 50%, largely driven by new large energy users, many of which are data centres. This presents a challenge to Ireland's emissions targets and to Ireland's security of supply. Included in the targets for the electricity sector is to '*Expand and reinforce the grid through the addition of lines, substations and new technologies*'.

5. Woodland to Finglas Solutions

5.1 Woodland Substation to Finglas Substation Study Area

The Woodland substation to the Finglas substation Study Area (hereafter referred to as the Finglas Study Area) is outlined in Figure 5-1.

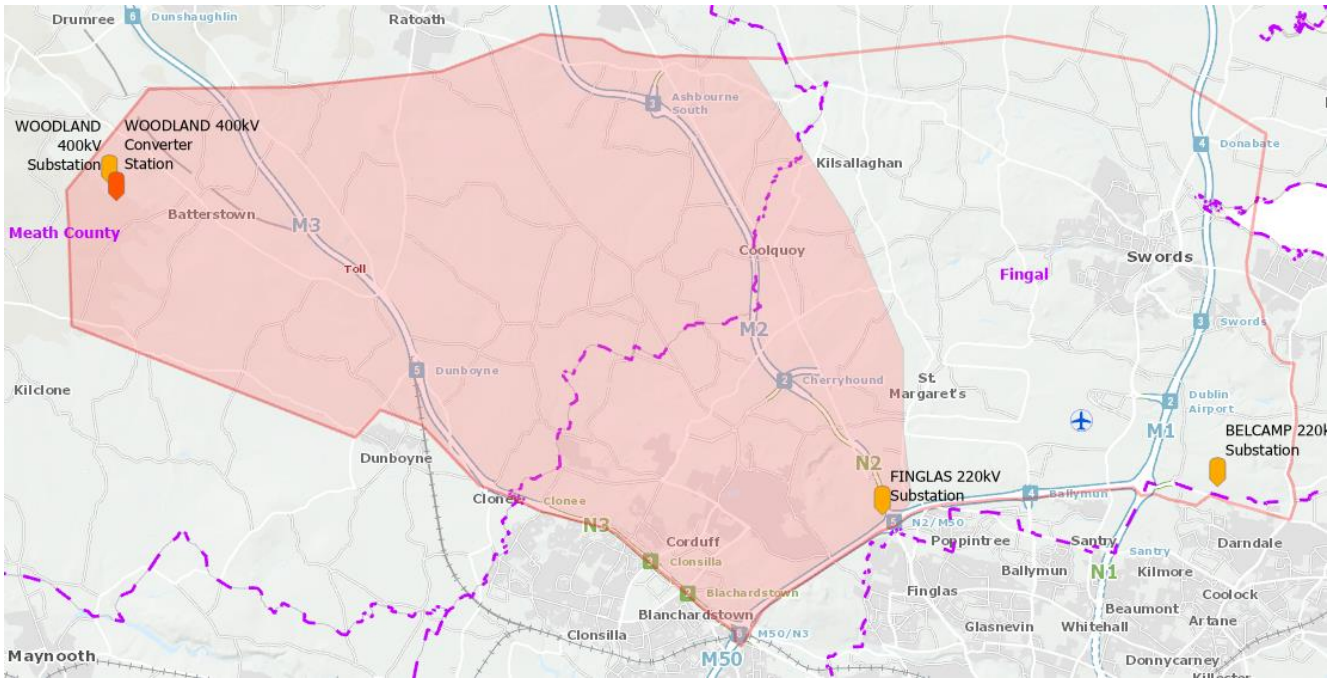

Figure 5-1 Finglas Study Area

The development of the Finglas Study Area has been influenced by EirGrid's policies and guidance on routing and infrastructure. Whilst a 'straight line' between Woodland and Finglas would present the shortest route with the fewest turns, it would also encounter a significant number of constraints, including settlements and designated / protected cultural heritage sites. The Finglas Study Area has therefore been set wide enough to allow for the avoidance of environmental and social constraints, however it does not include consideration of constraints in the wider Project Study Area which have no bearing on feasible connections between Woodland and Finglas substations. For this reason, the Finglas Study Area does not extend north and east of Dublin Airport. However, for certain constraints, consideration is given to areas outside of the Finglas Study Area; for example, in the case of birds which may migrate across the area from breeding and feeding grounds elsewhere, such as coastal areas.

5.2 Finglas Study Area Baseline Environment

5.2.1 Biodiversity, Flora and Fauna

Biodiversity constraints within the Study Area are presented in Appendix A, (document reference 321084AJ-MAP-002).

There are no internationally designated sites within the Finglas Study Area. Malahide Estuary SAC and SPA are the nearest European sites and are located c.7km from, and downstream of, the eastern boundary of the Finglas Study Area. Malahide Estuary SAC is designated for several Annex I coastal and estuarine habitats. Malahide Estuary SPA is designated for nationally and internationally important wintering bird populations and wetland habitats. The Finglas Study Area is also hydrologically connected to the SAC and SPA via upper reaches of the Broadmeadow and Ward water body catchments which discharge to Malahide Estuary.

Several other European Sites are present in the vicinity of the Finglas Study Area including Baldoyle Bay SAC; North Dublin Bay SAC; Howth Head SAC; Baldoyle Bay SPA; North Bull Island SPA; South Dublin Bay, River Tolka Estuary SPA, Rockabill to Dalkey Island SAC; Ireland's Eye SAC; South Dublin Bay SAC; Rogerstown Estuary SAC; Lambay Island SAC; Ireland's Eye SPA; Howth Head Coast SPA; Rogerstown Estuary SPA; Lambay Island SPA and Dalkey Islands SPA.

The Finglas Study Area is hydrologically linked to a number of these sites via waterbodies which cross the Study Area and ultimately discharge to coastal habitats (See Section 5.2.2 Soils and water for further details).

There are no Designated Salmonid Waters under S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations 1988 with the study area, however the Tolka catchment is identified by IFI as supporting salmonid species along its length.

There are no NHA sites within the Finglas Study Area however the Royal Canal pNHA is located within the southern section of the Finglas Study Area near Blanchardstown. The majority of SPA sites in the vicinity of the Finglas Study Area are designated for non-breeding birds. EirGrid Evidence Based Environmental Studies - Study 5: Birds (EirGrid, 2016a) concludes that the risk of electrocution of birds in Ireland is very low in overhead transmission lines. Species which may be at risk of electrocution include larger species of raptor and wildfowl (swans and geese). Collision risk to birds from operation of high voltage transmission network primarily arises from collision with shieldwires. Rose and Baillie (1992) considered that all herons, swans, geese and raptor species (including owls) are vulnerable to collisions with overhead wires however they did not distinguish between transmission and distribution lines. A number of other bird species were also identified as potentially vulnerable to power line mortality but with low representation in the studies including gamebirds, some waders and some passerines. Of particular concern are species listed under Annex I of the EU Birds Directive (2009/147/EC), red listed birds of conservation concern (Gilbert et al., 2021), and migratory water birds. Such species are at particular risk when travelling between roosting/nesting and feeding sites.

Several species vulnerable to overhead wire collision are known to utilise areas within the Finglas Study Area and outside of SPA sites for foraging, roosting, commuting and migrating. Dublin Bay is the most important site for Brent geese in the Republic of Ireland providing reliable access to food, water and a safe roosting location. Brent geese will preferentially use foraging sites close to their roost site if available and their preferred ranging distance is to foraging areas within 3km of their roost sites. However, the Dublin flock are known to use the amenity grassland throughout Dublin city and farmland throughout the hinterland beyond 3km. There are fewer available records for the western half of the Finglas Study Area. Overhead lines within the Finglas Study Area could present potential collision risks to commuting and migrating birds to and from Dublin Bay particularly larger birds with low maneuverability. Birds are most at risk of collision where (thinner) shield wires are installed, and when moving between foraging and roosting grounds which are often undertaken as low-altitude flights during low light levels (e.g. dawn and dusk) and therefore in poor visibility.

There are bats present across the Finglas Study Area, and more so to the west near Clonee and Dunboyne; in particular, the Common Pipistrelle bat is present close to Dunboyne. The Lesser Horseshoe bat, which is the only bat species in Ireland for which SACs are designated for, is not present in the Study Area, as it is restricted to the western Atlantic seaboard. In terms of potential impacts on bats, EirGrid's Evidence-Based Study 3: Bats (Eirgrid, 2015) concludes that collision with power lines is considered to be a very low risk for most Irish bat species, since their echolocation capabilities should allow them to detect support structures and lines. There is no risk of electrocution caused by bats interaction with electricity transmission infrastructure (EirGrid, 2015).

The Finglas Study Area also includes the following other habitats important for biodiversity:

- Biodiversity-rich hedgerows and trees throughout, especially in the northern part of the Study Area;
- Ancient and long established woodland (Abbotstown);
- Several wetland habitats which will support several Special Conservation Interest species of the SPA;
- Royal Canal pNHA;

- Rare flora in the Fingal area; and
- The River Tolka which supports salmonid species although it is not designated in the Salmonid Regulations (S.I. 293 / 1988).

5.2.2 Soils and Water

Geology, Soils and Groundwater

Geological constraints within the Study Area are presented in Appendix A, (document reference 321084AJ-MAP-003). Soils constraints are shown in Appendix A, document reference 321084AJ-MAP-008. Groundwater constraints are shown in Appendix A, document reference 321084AJ-MAP-005.

The Finglas Study Area is mainly comprised of soils containing fine loamy drift with limestones associated with the Straffan Association (including the area at Woodland substation) and the Elton Association (including the area at Finglas substation). The main subsoil type in this Study Area is limestone till (carboniferous) which makes up most of the central area and the area immediately surrounding Finglas substation. To the north west, particularly around Woodland substation, the subsoils are mainly comprised of shale and sandstone till (Namurian) with an area of alluvium to the north of the substation. There are also some small pockets of limestone sands and gravels, alluvium, and bedrock at surface to the east, particularly in the vicinity of Huntstown Quarry. Huntstown Quarry is a limestone quarry located directly to the north-west of the Finglas substation and is a Geological Heritage Site.

There are four groundwater bodies in the Finglas Study Area. The majority of the Finglas Study Area (including Woodland) is comprised of 'Locally Important Aquifer' with bedrock that is 'Moderately Productive only in Local Zones'. There are also some areas of 'Poor Aquifer' with bedrock that is 'Generally Unproductive except for Local Zones' running from the south-eastern part of the Finglas Study Area, particularly around Blanchardstown / Mulhuddart and the area at the Finglas substation. The Finglas Study Area mainly comprises low vulnerability aquifer to the west (including Woodland substation), with a mixture of aquifers of Moderate vulnerability and Extreme vulnerability to the south-east, and Rock Near or at Surface at Huntstown Quarry. The Finglas substation is located on Moderate vulnerability aquifer.

There are no karst landforms in the Finglas Study Area.

There is one Public Water Scheme at Dunboyne.

Surface Water

Surface water constraints are shown in Appendix A, document reference 321084AJ-MAP-004.

The Finglas Study Area straddles the Liffey and Dublin Bay catchment 09 to the south, and catchment 08 Nanny-Delvin to the north. The following sub-catchments are present within the Finglas Study Area:

- 08_3 Broadmeadow_SC_010;
- 09_4 Tolka_SC_020; and
- 09_10 Tolka_SC_010.

Woodland substation is located within sub-catchment 09_10 Tolka_SC_010 and Finglas substation is located within sub catchment 09_4 Tolka_SC_020. Within the Finglas Study Area there are 13 surface waterbodies present, as outlined in Table 5.1. The surface water flows from west to east discharging into Malahide Estuary, Mayne Estuary, Broadmeadow Estuary and Tolka Estuary. It is important to note the current pressures on surface waterbodies within the Finglas Study Area. The WFD status of the water bodies varies from Moderate to Poor, with 6 waterbodies of Poor status, 4 of Moderate status and 4 Unassigned. Of these 13 surface waterbodies, 11 are at risk of not meeting their WFD objectives. The main significant pressures are agricultural sources, urban wastewater, domestic and urban wastewater and hydromorphology as a result of extensive modifications from flood alleviation works.

No water bodies within the Finglas Study Area are designated as SACs. However, all are hydrologically connected to SACs and/or SPAs. Proximity and connectivity of watercourses to designated sites is provided in **Table 5.1**. No water body within the Finglas Study Area is within the 2km downstream limit identified in the UK's (England) Environment Agency and Planning Inspectorate guidance on WFD Assessment (used in the absence of Irish guidance) (Planning Inspectorate 2017) for scoping a Protected Area into the assessment. All are greater than 5km, which in Environmental Impact Assessment terms, would not be considered close enough to change the sensitivities of the water bodies in the determination of impacts during environmental assessment.

Table 5.1: Surface Waterbodies in the Finglas Study Area

Sub Catchment	Surface Waterbody	WFD Waterbody Status	At Risk Status	Key Pressures	Connectivity and Proximity to Designated Site
08_3 Broadmeadow_SC_010	Fairyhouse Stream_010	Poor	At Risk	• Urban runoff • Domestic wastewater • Agriculture • Hydromorphology	Approx. 12km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Broadmeadow_020	Poor	At Risk	• Urban runoff • Hydromorphology • Urban wastewater	Approx. 10.5km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Broadmeadow_030	Poor	At Risk	• Domestic wastewater • Hydromorphology • Agriculture	Approx. 11km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Ward_010	Unassigned	Review (likely At Risk given pressures identified)	• Agriculture • Domestic wastewater • Hydromorphology	Approx. 13.5km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Ward_020	Moderate	At Risk	• Agriculture • Urban wastewater • Hydromorphology	Approx. 11km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Ward_030	Moderate	Not at Risk	• Urban wastewater • Anthropogenic pressures from golf course • Hydromorphology	Approx. 6 km from Malahide Estuary SAC and SPA
09_10 Tolka_SC_010	Tolka_010	Moderate	At Risk	• Agriculture • Domestic wastewater	22.6 km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Dunboyne Stream_010	Moderate	At Risk	• Agriculture • Domestic wastewater	18km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Tolka_020	Poor	At Risk	• Agriculture	17km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Pinkeen_010	Poor	At Risk	• Agriculture • Domestic wastewater	15.5 km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Powerstown Dublin_010	Poor	At Risk	• Agriculture	14km from South Dublin and River Tolka Estuary SPA

Sub Catchment	Surface Waterbody	WFD Waterbody Status	At Risk Status	Key Pressures	Connectivity and Proximity to Designated Site
09_10 Tolka_SC_010	Tolka_030	Poor	At Risk	Industry	12.5 km from South Dublin and River Tolka Estuary SPA
09_4 Tolka_SC_020	Tolka_040	Poor	N/A	N/A	8.7km from South Dublin and River Tolka Estuary SPA

Flood Risk

Fluvial flooding is a known issue in some areas of the Finglas Study Area. Rivers at high risk of flooding (10% Annual Exceedance Probability [2] (AEP) or High Probability) include the Ward_010, Ward_020, Ward_030, Pinkeen_010, Tolka_010, Tolka_020, Tolka_030, Dunboyne Stream_010 and Fairyhouse Stream_010. There are also some small pockets of areas at risk of pluvial flooding spread widely across the Finglas Study Area.

There is no indication of historic fluvial or pluvial flooding at the Woodland substation and its immediate surrounding area. The Tolka_020 which is approximately 500m from Woodland substation (at its nearest point) is at risk of flooding (10% AEP or High Probability). There is some indication of pluvial flooding (10% AEP or High Probability and 1% AEP or Medium Probability) to the west of Woodland substation (approximately 500m).

There is no indication of historic fluvial flooding at the Finglas substation and its immediate surrounding area. There is a risk of pluvial flooding (10% AEP or High Probability and 1% AEP or Medium Probability) in the immediate vicinity of the Finglas substation, on its western boundary.

5.2.3 Material Assets – Planning Policy and Land Use

Regional Planning Policy

Eastern & Midland Regional Assembly Regional Spatial & Economic Strategy (RSES) 2019-2031

The Eastern & Midland Regional Assembly RSES highlights the fact that an increase in electricity demand is likely, due to increased population and economic development as well as a move away from the use of fossil fuels in the transport sector towards clean mobility. The RSES states that in order to decarbonise the Region by promoting a shift away from fossil fuels, it needs to, among other things support the expansion and upgrading of the grid with the aim of increasing the share of variable renewable electricity that the all-island system can accommodate.

Key general Regional Policy Objectives in support of the Proposed Development include RPO 10.20, which relates to supporting and facilitating electricity suppliers in order *"to serve the existing and future needs of the Region"* (p.226) and RPO 10.22, which supports, *"the reinforcement and strengthening of the electricity transmission and distribution network to facilitate planned growth and transmission/ distribution of a renewable energy*." (p.226)

In addition, RPO 10.23, commits to supporting EirGrid's Implementation Plan 2017-2022 and, in particular, to *"Support the installation of additional transformer capacity and increased circuit capacity to meet Dublin demand growth to strengthen the network for all electricity users and improve the security and quality of supply."* (p.226)

County Development Plans

Meath County Development Plan (Meath CDP) 2021 – 2027

The north west of the Finglas Study Area, including the Woodland sub-station itself, is located within County Meath. The principle for development for the proposed project is supported within the Meath CDP, which asserts that the sustainable future socio- economic growth of the County is dependent on ensuring high-quality, reliable

[2]Flood event probabilities are referred to in terms of a percentage Annual Exceedance Probability, or 'AEP'. This represents the probability of an event of this, or greater, severity occurring in any given year.

service provision, including the upgrading and enhancement of existing networks and the strengthening the national grid.

The Plan also identifies a range of policies that specifically support the delivery of electricity conveyance and supply development within the county, as set out in Table 5.2.

Table 5.2: Relevant Meath CDP Policies

Policies	
INF POL 46	To support and facilitate the development of enhanced electricity and gas supplies, and associated networks, to serve the existing and future needs of the County and to facilitate new transmission infrastructure projects that may be brought forward during the lifetime of the plan including the delivery and integration, including linkages of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner.
INF POL 47	To co-operate and liaise with statutory and other energy providers in relation to power generation in order to ensure adequate power capacity for the existing and future business and enterprise needs of the County.
INF POL 48	To ensure that energy transmission infrastructure follows best practice with regard to siting, design and least environmental impact in the interest of landscape protection.
INF POL 50	To require that the location of local energy services such as electricity, be undergrounded, where appropriate.
INF POL 51	To seek to avoid the sterilisation of lands proximate to key public transport corridors such as rail, when future energy transmission routes/pipelines are being designed and provided.
INF POL 52	To seek to generally avoid the location of overhead lines in Natura 2000 sites unless it can be proven that they will not affect the integrity of the site in view of its conservation objectives i.e. by carrying out an appropriate assessment in accordance with Article 6(3) of the E.U. Habitats Directive.

The Plan also sets out an objective relating to the transmission network, which is to:

INF OBJ 50- To seek the delivery of the necessary integration of transmission network requirements to facilitate linkages of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner.

An additional factor to take into consideration in terms of routing is Public Safety Zonings located within the Study Area relating to Dublin Airport and its flight paths. DM Objective 111 states:

DM OBJ 111- Development should be restricted which would give rise to conflicts with aircraft movements on environmental or safety grounds on lands in the vicinity of Dublin Airport and on the main flight paths serving Dublin Airport.

Early consultation with the relevant authorities will ensure the potential interactions between the proposed project and the airport safety zones are managed appropriately.

In addition to these policies and objectives, there are various Zoning Objectives and areas for proposed Master Plans identified within the Meath CDP that relate to parts of the Finglas Study Area, described in Table 5.3.

Table 5.3: Relevant Meath CDP Zoning Objectives

Zoning Objective	Interaction with Finglas Study Area
Ratoath: RA Obj 2 (Master Plan 33) and RA Obj 3 (Master Plan 34)	The Finglas Study Area includes two areas to the south of Ratoath which have been zoned for two forthcoming Master Plans, subject to an approved Master Plan to be agreed with the Executive of the Planning Authority. The plan has also zoned land falling within these masterplan areas for specific uses, as follows: • E2 - General Enterprise and Employment • D1 – Tourism • WL - White Lands • A1 – Existing residential

Zoning Objective	Interaction with Finglas Study Area
Dunboyne/Clonee/Pace: DCEOBJ 9	The Finglas Study Area includes areas to the north/north-east of Dunboyne, which has been zoned for three forthcoming Masterplans: • MP22 Lands at Dunboyne North • MP23 Lands at Bracetown/Gunnocks • MP24 Lands at Pace townland between Piercetown and Bracetown, east of the M3 Motorway. The plan has also zoned land falling within these masterplan areas for specific uses, as follows: • E1 - Strategic Employment Zones (High Technology Uses) • E2 - General Enterprise and Employment • E3 - Warehousing and Distribution • F1 - Open Space • A2 – New Residential • C1 – Mixed Use
Kilbride: Zoning Objective E2	The village of Kilbride also falls within the Finglas Study Area, which has areas zoned for E2 General Enterprise and Employment to the south of the village, as well as areas zoned as: • F1 – Open Space • G1 – Community Infrastructure • A1 – Existing Residential

Fingal Development Plan 2017-2023

The Finglas Study Area also incorporates parts of Fingal. The Fingal Development Plan (FDP) supports the principle of development for the proposed project, stating that the Council will work in partnership with service providers to facilitate the required enhancement and upgrading of existing infrastructure and networks.

The FDP sets out a number of objectives relevant to the Study Area, as set out in Table 5.4.

Table 5.4: Relevant FDP planning objectives

Policies	
Objective EN22	Facilitate energy infrastructure provision at suitable locations, so as to provide for the further physical and economic development of Fingal.
Objective DMS139	Seek the placing underground of all electricity, telephone and TV cables in urban areas. It is the intention of the Council to co-operate with other agencies as appropriate, and to use its Development Management powers in the implementation of this policy.
Objective DA13	Promote appropriate land use patterns in the vicinity of the flight paths serving the Airport, having regard to the precautionary principle, based on existing and anticipated environmental and safety impacts of aircraft movements.
Objective DA15	Take into account relevant publications issued by the Irish Aviation Authority in respect of the operations of and development in and around Dublin Airport.
Objective DA16	Continue to take account of the advice of the Irish Aviation Authority with regard to the effects of any development proposals on the safety of aircraft or the safe and efficient navigation thereof.

As with County Meath, factors to take into consideration in terms of routing are the Public Safety Zones located within the Study Area relating to Dublin Airport and its flight paths, ensuring early consultation with the relevant authorities to manage potential interactions between the proposed project and the airport safety zones.

In addition, there are various Zoning Objectives identified within the FDP that apply to parts of the Finglas Study Area. These are described in Table 5.5.

Table 5.5: Relevant FDP Zoning Objectives

Zoning Objectives	
CI -Community Infrastructure	Provide for and protect civic, religious, community, education, health care and social infrastructure

Zoning Objectives	
HI - Heavy Industry	Provide for heavy industry
GE - General Employment	Provide opportunities for general enterprise and employment
OS - Open Space	Preserve and provide for open space and recreational amenities.
HT - High Technology	Provide for office, research and development and high technology/high technology manufacturing type employment in a high quality built and landscaped environment
RA – Residential Area	Provide for new residential communities subject to the provision of the necessary social and physical infrastructure

Although falling outside the Finglas Study Area to the north west, a zoning of note is the Hansfield Strategic Development Zone (SDZ), an area of land designated by the Government to contain developments of economic or social importance to the State. Hansfield SDZ is described as a new sustainable community which includes residential development of approx. 3000 residential units as well as community amenities services and facilities. This SDZ is acknowledged due to its relative proximity and potential for interactions with the Finglas Study Area in terms of residents travelling to and from the various economic areas located within the Study Area.

Local Area Plans

Dunboyne, Clonee, and Pace Local Area Plan 2009-2015

The Dunboyne, Clonee, and Pace LAP is a statutory document which contains guidelines as to how the Dunboyne/Clonee/Pace Corridor should develop over the Plan period. Key to this was the identification of a number of Zoning Objectives. The Key objectives falling within the Finglas Study Area of particular note fall to the north of Dunboyne. These are identified in Table 5.6.

Table 5.6: Relevant Dunboyne, Clonee and Pace LAP Zoning Objectives

Zoning Objectives	
O1 / WL -Strategic reserve, White land	To provide for strategic employment uses predominantly for high end office development, to be developed on a phased basis, within the plan period.
M5 - Other mix of uses	To facilitate the phased development of a major town centre as designated in the Retail strategy for the Greater Dublin Area 2008-2016 in accordance with the provisions of a future framework plan
C3 - Office, business/technology park and related	To provide for light industrial and industrial office type employment in a high quality campus environment subject to the requirements of approved framework plans and the provision of necessary physical infrastructure.
C2.2 - General industry	To provide for industrial and related uses subject to the provision of necessary physical infrastructure

Ratoath Local Area Plan 2009-2015

The Ratoath Local Area Plan sets down the policy framework for the future growth of Ratoath. It consists of a written statement accompanied by a zoning and land use objectives map. It will guide development in the area until 2015 or until the Plan is amended or a new Plan is made. Zonings to the south of Ratoath lie within the Finglas Study Area, which are identified in Table 5.7.

Table 5.7: Relevant Ratoath LAP Zoning Objectives

Zoning Objectives	
P1 - Agriculture	To provide for the continued development and expansion of the equine related activities.
D1 - Tourism	To provide for visitor and tourist accommodation and leisure facilities.
E1 - General industry	To provide for industrial and related uses subject to the provision of necessary physical infrastructure.

Of particular note is the zoning 1km to the south of the town relating to the enhancement and diversification of the existing equine industry centred around Fairyhouse Racecourse and Tattersalls.

Significant Proposed Developments within the Finglas Study Area

There are a number of major projects proposed within the Finglas Study Area that are currently progressing through the planning system or are under construction. These are listed in **Table 5.8**.

In addition, there are a significant number of other planning applications in the planning system for a variety of proposed developments, from residential extensions to new apartment complexes to new industrial or business premises. Of particular note, are proposals for new data centres within the Finglas Study Area; there is one, for example, immediately north of Finglas substation and it requires the undergrounding of existing overhead lines to the north of the substation.

Table 5.8: National Infrastructure Provision

National Infrastructure Providers	Projects/ Programmes Already Aware of
EirGrid	North South Interconnector Kildare Meath Connection
Irish Water	Greater Dublin Drainage Ballycoolin to Kingstown Trunk water Main Regional Biosolids Storage Facility (nr Huntstown Power Station, Finglas) Blanchardstown Sewerage Upgrade Scheme (Tolka Park) – under construction
Transport Infrastructure Ireland (TII)	N3 M50 to Clonee upgrade works
National Transport Authority (NTA)	BusConnects Luas Finglas
Irish Rail	DART+ West
Dublin Airport	Second runway – under construction

Land Use

The land use in the north and west of the Finglas Study Area is predominantly pasture and non-irrigated arable land. There are some pockets of complex cultivation patterns, discontinuous urban fabric and sports and leisure facilities. Moving toward Finglas in the south-east of the Finglas Study Area, the land use becomes more urban in nature with industrial or commercial units, construction sites, green urban areas and discontinuous urban fabric. There are still some small pockets of pastures and complex cultivation patterns in this section.

The land use immediately surrounding Woodland substation is pasture, with a pocket of non-irrigated arable land approximately 1.3km to the south-east. There is no forestry or any peat/ bogs present. The Trim Road is about 750m from Woodland substation.

The land use immediately surrounding Finglas substation is road and rail networks and associated land. There is some pastureland use to the immediate west of the substation, non-irrigated arable land use to the east of the N2 National Road corridor and complex cultivation patterns to the immediate north of the substation. There is also a mineral extraction site associated with Huntstown Quarry, as well as well as a power station (Huntstown Power Station) to the north-west of Finglas substation.

In addition to the substantial presence of Dublin International Airport to the east of the Study Area, there are a number of major transport networks in the Finglas Study Area, including the M3 Motorway / N3 National Road to the east of Woodland substation and the M2 Motorway / N2 National Road to the east of Finglas substation. There is also the Dublin to Maynooth railway line in the west of the Finglas Study Area in the vicinity of Dunboyne.

5.2.4 Landscape and Visual

Landscape constraints are shown in Appendix A, document reference 321084AJ-MAP-006.

The majority of the Finglas Study Area is located in Lowlands, including the South East Lowlands LCA at Woodland substation and surrounds and the Ward Lowlands LCA to the east of Woodland. The Tara Skryne Hills LCA lies to the immediate south-west of Woodland. The landscape of the South East Lowlands LCA is dominated by small

fields, bounded by mature hedgerows, with clusters of woodland. Moving east toward Finglas substation, the predominant feature is Low Lying Agricultural LCA at Finglas substation and its surrounds. There are also some areas of River Valleys/ Canal LCA to the south and Rolling Hills with Tree Belts LCA to the north-east of the Finglas Study Area.

The Meath CDP has assigned the South East Lowlands as Very High Value and Moderate Sensitivity, Tara Skyrne as Exceptional Value and High Sensitivity, the Royal Canal as High Value and Moderate Sensitivity, and the Ward Lowlands as Low Value and High Sensitivity. The FDP has assigned Low Lying Agricultural LCAs as Modest Value and Low Sensitivity, Rolling Hills LCAs as Modest Value and Medium Sensitivity, and the River Valleys/ Canal LCA as High Value and High Sensitivity. There are no major landmarks in the Finglas Study Area. These landscapes can absorb a certain amount of development once the scale and forms are kept simple and surrounded by adequate screen boundaries and appropriate landscaping to reduce impact on the rural character of the surrounding roads. Particular parts of high sensitivity areas have a low capacity to absorb new development.

There are a number of clusters of residential properties across the Finglas Study Area including Batterstown to the east of Woodland substation, Dunboyne to the south-east of Woodland, Mulhuddart / Clonee to the west of Finglas substation and St. Margaret's to the north-east of Finglas substation. At Woodland substation, the nearest sensitive receptors are individual residential properties to the south and east, approximately 1km to 2km in distance, respectively. At Finglas substation, the nearest residential properties are approximately less than 200m to the north of the substation.

5.2.5 Cultural Heritage (Archaeological and Architectural Heritage)

Cultural heritage constraints are shown in Appendix A, document reference 321084AJ-MAP-007.

The Woodland and Finglas substations are not directly situated on any features of cultural heritage importance. There are no World Heritage Sites in the Finglas Study Area, but it includes the following cultural heritage assets:

- There are a few National Inventory of Architectural Heritage (NIAH) sites within the Finglas Study Area, at Batterstown, Hollystown and Buzzardstown;
- Meath and Fingal Record of Protected Structure (RPS) sites are identified throughout the Finglas Study Area. There is a small cluster to the north of Batterstown / east of Woodland substation, however, there are many more identified in the southern half of the Finglas Study Area. There are larger clusters between the M3 Motorway / N3 National Road and M2 Motorway/ N2 National Road corridors (in the south of the Finglas Study Area), to the north of Mulhuddart / Corduff, and to the east of the Finglas substation area, across the N2 National Road corridor;
- National Monuments are relatively evenly and widely distributed throughout the Finglas Study Area. Similarly to the RPS sites, there is a small cluster to the north of Batterstown / east of Woodland substation, and larger clusters between the M3 Motorway / N3 National Road and M2 Motorway/ N2 National Road corridors, to the north of Mulhuddart / Corduff, and to the east of the Finglas substation area, across the N2 National Road corridor. In addition, NMS sites are identified between the M3 and M2 in the northern half of the Finglas Study Area and there is a cluster to the south of Ashbourne; and
- Archaeological Resources and Areas of Archaeological Potential (AAP): There are AAPs widely distributed across the Finglas Study Area. There are no recorded AAPs at Woodland and there is one AAP (a Drumlin) located directly to the north of Finglas substation.

5.2.6 Noise and Vibration

Under Statutory Instrument (S.I.) No. 140/2006 – Environmental Noise Regulations 2006, county councils are designated as the responsible parties for the preparation of Noise Action Plans for the management and control of road, rail, major industrial and aircraft noise sources. Fingal County Council have developed a Noise Action Plan for Fingal County Council 2019 - 2023 and a separate Noise Action Plan for Dublin Airport 2019 - 2023. Meath County Council have also developed a County Meath Noise Action Plan 2019.

Noise pollution is considered to have a greater impact at certain locations and certain building types are considered to be more sensitive than others (i.e. residential properties, schools, hospitals and residential care facilities). There are a number of these facilities across the Finglas Study Area and the main residential / built up areas include Batterstown to the east of Woodland substation, Dunboyne to the south-east of Woodland, Mulhuddart / Clonee to the west of Finglas substation and St. Margaret's to the north-east of Finglas substation. The main sources of noise in the Finglas Study Area include the M3 Motorway / N3 National Road to the east of Woodland substation, the M2 Motorway / N2 National Road and M50 Motorway directly to the east and south of the Finglas substation, respectively, and Dublin Airport, for which flight paths pass over the Finglas Study Area, particularly to the south.

At Woodland substation, the nearest sensitive receptors are residential properties to the south and east, approximately 1km to 2km in distance, respectively. As this area is more rural in nature, it would be more susceptible to noise impacts. There is no current noise monitoring in the vicinity of Woodland substation. The nearest modelled location is at the M2 Motorway approximately 3km to the north-east. At Finglas substation, the nearest residential properties are approximately less than 200m to the north of the substation. However, this area is dominated by noise from the M50 Motorway directly to the south and the N2 National Road directly to the east, and from aircraft taking off from or landing into Dublin Airport which is approximately 2.3km to the north-east. The noise levels experienced at the Finglas substation range from 65-69dB (decibels)[3] and 70-75dB during the daytime from the nearby road networks.

5.2.7 Climate Change

There is no local baseline for climate change. The baseline is taken to be as set out in Section 4.2.7.

5.3 Solution Option 1 – New Finglas to Woodland 400 kV Overhead Line (OHL)

Solution Option 1 involves a transmission network reinforcement to strengthen the network between the existing Woodland 400 kV substation in County Meath and the Finglas 220 kV substation in North County Dublin. The reinforcement consists of a new 400 kV OHL linking the Woodland 400 kV substation to the Finglas 220 kV substation, and a new 400 kV busbar and 400 kV/ 220 kV transformer at Finglas substation.

5.3.1 Assumptions and Limitations

For this Option, the following assumptions have been made:

- The OHL would be constructed using access tracks from local roads, no access track along the route corridor would be installed;
- If bridges are required these would be temporary (e.g. baillie) bridges and not intrude upon any water bodies; where possible, stringing will take place using other techniques across waterbodies; and
- The routing of an OHL would take flood plains into consideration and avoid, wherever possible.

There are limitations to the assessment:

- There are currently no defined routes for the OHL, and as such, this assessment considers a reasonable worst-case scenario whereby protected sites (for all environmental topics assessed in this Report), main settlements and highly sensitive landscapes are generally avoided, but thereafter, the greatest potential impacts on environmental constraints are identified.

[3] A decibel is a unit used to measure the intensity of a sound or the power level

5.3.2 Potential Impacts and Risk Ratings for Option 1

Biodiversity, Flora and Fauna

In the absence of mitigation, potential effects on biodiversity during construction include:

- Temporary loss of terrestrial and aquatic habitat within the footprint of the Project to facilitate access roads and construction compounds;
- Disturbance, and temporary displacement of birds, mammals, amphibians, fish and other aquatic species from the working corridor and in close proximity to the Project;
- Temporary habitat loss/ fragmentation of foraging habitat for mammals such as badger and bat; and
- Pollution of surfaces waters, leading to secondary effects on aquatic species.

All of the water bodies in the Study Area are hydrologically connected to a coastal designated site (s) most of them to Malahide Estuary which is an SAC and SPA. For the most part, the proposed project would cross these water bodies some distance away from the SACs/SPAs; at their closest point within the Study Area, the water bodies are between 6 and 25km from them. However, the hydrological connection means that there is potential for significant impacts on the SACs as a result of construction activity in or near to the water bodies in the Study Area. For the OHL, the risks would be associated with the crossing of the water bodies and excavations for pylon foundations in close proximity to them. The assessment of potential impacts on the water bodies is provided in the Soils and Water section. This concludes no significant impact would occur. As a result, in the absence of mitigation, the risk to designated sites during construction of the OHL is low to moderate.

In the absence of mitigation, potential effects on biodiversity during operation include:

- Permanent loss of habitat within the footprint of pylons;
- Continued disturbance and/or displacement of species from maintenance works; and
- Collision risks to birds, particularly associated with (thin) shieldwires, if and where installed.

For the bats present in the Study Area, the potential effects of OHL development on bat ecology relate primarily to the potential for temporary and/or permanent habitat loss and fragmentation during construction, and/or permanent impacts during operation. The potential effects may include damage or destruction/removal of bat roost sites and foraging sites. In addition, the routing of an overhead transmission line can potentially continue to affect bat foraging and/or transit routes across the local landscape.

There is potential for bird species utilizing sites surrounding the Finglas Study Area to migrate or move locally along or across an OHL route. In addition to collision risk, other potential effects of transmission infrastructure development on birds in the absence of mitigation include the potential for temporary and/or permanent habitat disturbance/loss and/or fragmentation during the construction stage leading to potential impacts on roosting and/or nesting sites, as well as foraging habitat.

In the absence of mitigation, there could be disturbance or collision risk to Brent goose and other bird species during construction and operation. A new OHL presents a potential collision risk and, impacts could be significant, where they occur to rare or protected species. However, EirGrid Evidence Based Environmental Studies – Study 5: Birds (EirGrid 2016a) concludes that collisions with power lines are generally considered to be rare events.

In the absence of mitigation, potential impacts on trees would be permanent; there is a possibility for veteran trees within the Finglas Study Area to be affected by a new OHL. Trees with the potential to interfere with the OHL (e.g. under or in close proximity to one) may require removal or are likely to require trimming throughout OHL operation. There is an ancient and long-established woodland at Abbotstown in the south west of the Study Area; but this is assumed to be avoided by an OHL.

Colour Coding for MCA – Biodiversity

Therefore, due to the potential impacts from Option 1 noted above there is a Moderate to High risk of potential significant impacts to biodiversity, in the absence of mitigation.

Biodiversity

Soils and Water

Geology, Soils and Groundwater

There would be limited impacts on soils and geology for Option 1. Potential impacts would be limited to construction, notably within the footprint of any pylons required. The OHL would not be routed across any karst landforms or sensitive soil types such as bog or peat, and therefore, it is not anticipated that the OHL between Woodland and Finglas would have significant impacts on geology or soils during construction. There would be no predicted impacts during operation. Therefore, due to the potential impacts from Option 1 noted above, there is a Low risk of potential significant impacts to geology, soils and groundwater.

Surface Water

There are a number of potential impacts on surface water during the construction of an OHL and minimal impacts associated with the operation of an OHL due to maintenance requirements for pylons.

During construction of the OHL, generic impacts on surface water In the absence of mitigation would include:

- Silty water runoff: surface water and dewatered groundwater containing high loads of suspended solids from construction activities. This includes the stripping of topsoil during site preparation; the dewatering of excavations and the storage of excavated material;
- Runoff being contaminated by a spillage or leakage of oils and fuels stored on site or direct from construction machinery. In the event of a spillage, there is a high likelihood of groundwater contamination. The slopes created by overbridging may increase the likelihood of surface water pollution from a spill;
- Change in the natural hydrological regime due to an increase in discharge as a result of dewatering. This may include changes to surrounding groundwater flow,
- Contaminated soil from previous land uses being disturbed causing pollutants such as heavy metals to enter ground and surface waters; and
- High alkalinity runoff as a result of concrete works.

Without mitigation, there is the potential for significant impacts on surface water receptors during the construction phase. However, the potential impacts identified can be managed through the use of standard best practice techniques in construction and so it is not anticipated that significant impacts would occur.

In addition, with careful siting of pylons, construction work would not need to be close to waterbodies apart from at crossing points. No bridges are required and stringing could take place using other techniques across waterbodies. Therefore, due to the potential impacts from Option 1 noted above, there is a Low risk of potential significant impacts to surface water.

Flood Risk

The new OHL would have a very limited potential for impact on flood risk during construction and there would be none during operation. There is no current history of fluvial flooding in the areas at Woodland or Finglas, but there is a risk of pluvial flooding in the western boundary of the Finglas substation. Overall, across the Finglas Study Area, there is the potential for flooding to affect the construction of the OHL, depending on the final route. A route across a flood plain could prove difficult or even unsafe at certain times of the year for construction, but the routing

of an OHL would take these into consideration and avoid, wherever possible. Therefore, due to the potential impacts from Option 1 noted above, there is a Low risk of potential significant flood risk impacts.

Colour Coding for MCA – Soils and Water Combined

For Option 1, the combined risks to soils and water are considered to be Low, in the absence of mitigation.

Soils and Water

Material Assets – Planning Policy and Land Use

Planning Policy

There is potential for interaction with various plan zonings within the Fingal Study Area. For Solution Option 1 this includes the strategic reserve and major town centre/light industrial/technology zonings to the north of Dunboyne and coming into the Fingal area.

While plan policies are broadly in support of electricity conveyance improvement and reinforcement development within the Finglas Study Area, they pro-actively favour UGCs, with both councils having a policy seeking to ensure the undergrounding of cables (INF POL 50 in Math CDP, Objective DMS139 in FDP). Whilst the LPAs have a clear preference for UGCs, they are generally supportive of improved electrical infrastructure to support regeneration and growth initiatives and policies.

Improving capacity to the outlying areas of the wider Dublin area is also beneficial for the increased emphasis on 'High Technology' development within the zonings present in the Finglas Study Area. Potential impacts can be minimised with appropriate routing and early engagement with Planning Authorities. Therefore, due to the potential impacts from Solution Option 1 noted above, there is a Moderate risk of potential significant impacts in terms of planning policy.

Significant Planning Application/Proposed Developments

There is potential for Solution Option 1 to have impacts upon the various granted, ongoing or forthcoming planning applications within the Study Area, be they residential, employment or strategic infrastructure, as Overhead Lines have added complexities in terms of siting and potential visual impact. However, these potential impacts to applications granted or currently being determined can be significantly mitigated through appropriate routing, and robust planning application monitoring can ensure forthcoming applications will be quickly identified and taken into account. Therefore, there is a Low to Moderate risk of potential significant impacts in terms of planning policy.

Land Use

There would be limited impacts on land use as a result of Option 1. New OHL corridors would require limited and temporary land take for construction, with short access tracks from local roads being used, wherever possible. Permanent land take would be limited to the footprint of the OHL pylons. The main impact would be associated with construction. However, there may be restrictions on land use going forward as a result of the OHL crossing certain types of land. Depending on the route, it could lead to sterilisation of development land, concerns relating to different agricultural practices, or impacts on property values. Land use is also more urban in nature moving to the east of the Finglas Study Area which presents additional physical constraints. Perceived and actual impacts on land values would present significant constraints both in rural and urban areas. With careful routeing of OHL in consultation wih communities and landowners, the risk of impacts would be reduced. There is no scope for installing OHL in public roads however as there is for UGC so almost all of the land use would be 3rd party lands. As a result, there is a Moderate risk of potential significant impacts to land use.

Colour Coding for MCA – Planning Policy and Land Use Combined

For Option 1, there is a combined Moderate risk of potential significant impacts to planning policy and land use, in the absence of mitigation.

Planning Policy and Land Use

Landscape and Visual

A new OHL and associated pylons are likely to have an impact on the local landscape and views. Effects on landscape occur when there is considered to be a significant change in the landscape as a result of the introduction of a new structure and this significance depends upon the sensitivity of the landscape and the size or magnitude of the structure. The routing of a new OHL through a sensitive landscape is likely to have a significant impact on that landscape.

In terms of views, the sensitivity is that of the 'viewer' and the magnitude of the effect is determined by how prominent the structure is within certain views. A very large magnitude, for example, would command a view; a very small magnitude would be where the structure was not obvious or indistinct in views. In this regard, scenic routes and viewpoints are important or sensitive receptors, as are local communities, in particular residential dwellings. Some tourism sites may also depend upon views and would be considered sensitive receptors.

As stated previously, the majority of the landscape in the Finglas Study Area is characterised as lowlands and low-lying agricultural land, with a smaller proportion of industrial and transport land use to the south-east. The South East Lowlands are assigned Very High Value and Moderate Sensitivity, the Ward Lowlands as Low Value and High Sensitivity and the Low Lying Agricultural LCAs are assigned as Modest Value and Low Sensitivity. OHLs are generally visible across large scale flat landscapes. The majority of views across the wider Study Area would typically be experienced by individual properties and settlements within 1km of infrastructure, and impacts are likely to be greatest in the South-East Lowlands surrounding Woodland substation and the Ward Lowlands to the east of the substation which are assigned as Moderate and High Sensitivity landscapes, respectively. EirGrid Evidence Based Environmental Studies - Study 10: Landscape and Visual (EirGrid 2016b) considered the potential impacts of OHLs in different landscapes and for different heights of pylons (depending on whether 110, 220 or 400kV OHL) and concluded that significant visual effects from 400kV pylons occurred within 800m but the most significant were within 400m. No significant effects were found after 800m. In terms of landscape types, 400kV pylons were found best absorbed within urban and lowland agricultural landscapes but also high drumlin. Therefore, 400kV pylons were found best absorbed within lowland rural landscapes. Screening is not as effective at reducing prominence [in these areas] but the study emphasized the importance of 'routing of lines to maximise "backclothing"'

The assumptions of the assessment are that a new OHL would avoid protected sites, main settlements and highly sensitive landscapes, wherever possible. There is still the potential for effects on other landscapes and on views, both from designated viewpoints and from residential properties, particularly the smaller, linear communities that are present throughout the northern half of the Finglas Study Area.

Colour Coding for MCA – Landscape and Visual

Therefore, due to the potential impacts from Option 1 noted above, there is a Moderate to High risk of potential significant impacts to landscape and visual receptors, in the absence of mitigation.

Landscape and Visual

Cultural Heritage (Archaeological and Architectural Heritage)

During construction, there is the potential for heritage assets to be affected, particularly unknown archaeology, during excavation works for pylon foundations. However, given the relatively small footprint of pylon foundations, it is during operation that the greatest potential for impacts occurs: , there is the potential for a new OHL to affect the setting of the heritage assets identified in the Finglas Study Area. In particular, national monuments could be impacted as these are widely distributed throughout the Finglas Study Area and present in significant clusters in some parts of the Finglas Study Area.

Colour Coding for MCA – Cultural Heritage (Archaeological and Architectural Heritage)

Therefore, due to the potential impacts from Option 1 noted above, there is a Moderate risk of potential significant impacts to cultural heritage assets, in the absence of mitigation.

Cultural Heritage

Noise and Vibration

The construction of a new OHL and associated pylons would be likely to generate noise and vibration along the general construction working width, and most notably from works for pylon foundations. This noise impact would be temporary. There is also the potential for low levels of noise associated with the OHLs during operation due to the electrical current passing through them.

There are a number of ways in which noise can be generated from electricity infrastructure. EirGrid Evidence Based Environmental Studies - Study 8: Noise (EirGrid 2016c) identified the following four categories of noise:

- Audible noise associated with "Corona Noise" from high voltage transmission lines – generally heard as crackling and hissing;
- Audible noise associated with dirty, damaged or cracked insulators;
- Audible noise associated substation equipment; and
- Audible noise associated with wind blowing through electricity infrastructure – this is called "Aeolian Noise".

The Study concluded that 400kV OHL produce significant 'Corona Noise' effects within 200m of the OHL, especially at night or under humid or wet conditions.

There is likely to be a greater impact in the area of Woodland substation due to its rural nature and relatively low baseline noise environment, but moving across toward Finglas, the impact is not likely to be significant considering the current level of noise experienced in this area due to its close proximity to the major road network and Dublin Airport. The assumptions of the assessment are that the new OHL would avoid sensitive receptors, insofar as possible, and that adequate screening would be provided for construction works to avoid generating noise nuisance.

Colour Coding for MCA – Noise and Vibration

Therefore, due to the potential impacts from Option 1 noted above, there is a Low to Moderate risk of potential significant impacts due to noise and vibration, in the absence of mitigation.

Noise and Vibration

Climate Change

Benefits

All of the technology options are proposed to reinforce the transmission network in Ireland and in particular to support the delivery of energy from renewable sources, protect security of supply and help to deliver economic growth through the provision of electricity to new, large energy consumers such as data centres. This is fundamentally the 'Project need' and is the same for all options. It will not be discussed further in the consideration of the four options within this report, however it is important to note here that the Proposed Project will help to facilitate the achievement of Ireland's greenhouse gas emissions targets.

Further the location of the Proposed Project, whether the connection is to Finglas or Belcamp, has been chosen because the Greater Dublin area is a focal point for growth and the transmission network in this area will, in the near future, be required to develop a secure supply of electricity to an increased number of new homes and large energy consumers. There are already a number of existing data centres in the Project Study Area, including at Blanchardstown and near to Belcamp and planning applications are already in the Planning System for new ones, for example immediately north of Finglas substation.

Overview of Potential Impacts

In terms of the potential impacts of the four options, consideration is given to:

- Climate resilience: new energy infrastructure is a long-term investment and will need to remain operational over many decades, in the face of a changing climate; and
- Material use/embodied carbon

Climate Resilience

In terms of climate resilience, consideration has been given to the vulnerability of an OHL to potential impacts of climate change such as:

- Flooding;
- Effects of wind and storms;
- Higher average temperatures leading to increased transmission losses; and
- Earth movement or subsidence caused by flooding or drought.
- OHLs are potentially vulnerable to flooding, winds and storms and transmission losses; they are less vulnerable to earth movement than other climate factors, however subsidence could impact upon pylon foundations and result in damage to the local network. Winds and storms are of particular concern to OHLs and there are a number of examples of OHL transmission networks being damaged during significant storms.
- Flooding is of concern mainly in terms of accessibility to OHL for repair; in the event of a storm causing damage to an OHL, access to it for repair would be hampered if a pylon were situated in a flood risk area and the storm also brought about localised flooding.

The shortest OHL from Woodland to Finglas would be a straight line between the two and would be approximately 19km. It would not be possible to achieve this route given the existing constraints and so it is likely that the route would be up to 25km. It is considered this presents a Moderate risk in terms of climate resilience.

Materials Use

A typical span between pylons for OHLs is approximately 350m; this is shortened or can be lengthened depending upon the necessity for turning or oversailing constraints. At up to 25km long, an OHL route to Finglas substation would therefore require at least 70 pylons made of galvanized steel; given the constraints closer to Finglas it is likely that the number in reality would be higher and there could be a number of 'angle pylons' which are larger

than the 'normal' pylons used along a straight line stretch of OHL. Each pylon would also require concrete foundations of approximately 1000m3, amounting to 75,000m^3 of concrete for the route. Whilst this would amount to a relatively small proportion of the total carbon budget for Ireland, there is a large amount of material required. Since a reduction in greenhouse gas emissions is required, this would be a Low to Moderate risk of a significant impact.

OHL conductors do not require to be insulated as this is provided by the air in which they are strung. This minimises the materials used in the transmission to that of the conductor only. The 400kV OHL would be a single circuit, with three conductors. This amounts to approximately 75km of conductor material. It is considered this presents a Moderate risk in terms of embodied carbon.

Colour Coding for MCA – Climate Change

Taking into account the Moderate risk of significant impacts relating to climate resilience, and the Moderate risk of significant impacts to greenhouse gas emissions as a result of the embodied energy in the materials proposed to be used for both the pylons and conductors, it is considered this presents an overall Moderate risk .

Climate Change

5.3.3 Summary of Environmental MCA for Option 1

The greatest risks of significant impacts as a result of this option are associated with biodiversity and landscape and views, which have a moderate to high risk rating. This is as a result of OHLs posing a collision risk to migratory birds, a loss of mature trees and significant impacts on views. This option also has the potential to conflict with local planning policies, impact on the setting of cultural assets and is less resilient to climate change than an underground option would be. As a result this option has a moderate risk of significant impacts to the environment overall.

More Significant/ Difficult/ Risk Less Significant/ Difficult / Risk

Table 5.9: Option 1 Constraints Risk Assessment

Topic	Option 1 (New Finglas to Woodland OHL)
Biodiversity	Moderate to High
Soil and Water	Low
Planning Policy and Land Use	Moderate
Landscape and Visual	Moderate to High
Cultural Heritage	Moderate
Noise and Vibration	Low to Moderate
Climate Change	Moderate
Summary	Moderate

Biodiversity

There is a moderate to high risk of significant impacts on biodiversity as a result of this option. There is potential for impacts on protected sites as al of the water bodies in the study area are hydrologically connected to European designated sits on the coast; there will be a permanent loss of habitat within the footprint of the pylons and as a result of a loss of some mature trees and there is a collision risk to birds migrating across the study area. Although

literature suggests that bird collisions with power lines are generally considered to be rare events, there is still potential for collision risk to bird species from the new OHL in addition to disturbance leading to displacement.

Soils and Water

There is a low risk of significant impacts on soils and water as a result of this option. The impacts would be only likely to occur during construction. These impacts would be fairly limited as Option 1 would aim to avoid designated water bodies and excavations would be limited to new pylon foundations. Short access tracks from local roads would be used, where possible, and would require minimal soil strip in site preparation.

Material Assets - Planning Policy and Land Use

There is a moderate risk of conflict with planning policy and significant impacts on land use as a result of this option. There are some potential interactions with plan zonings within the Finglas Study Area; plan policies are broadly in support of electricity conveyance improvement and reinforcement development within the Finglas Study Area, however, it is possible that Option 1 would not fully accord with county planning policies, as new structures are proposed and there is a preference for new transmission connections to be underground. Perceived and actual impacts on land values may present significant constraints both in rural and urban areas. With careful routeing of OHL in consultation with communities and landowners, the risk of impacts would be reduced.

There is little scope for installing OHL in public roads however as there is for UGC so almost all of the land use would be 3rd party lands. New OHL corridors would require limited and temporary land take for construction, with short access tracks from local roads being used, wherever possible. Permanent land take would be limited to the footprint of the OHL pylons. There would however be a small number of significant impacts on particular parcels of land during the operational phase due to potential land use restrictions.

Landscape and Visual

There is a Moderate to High risk of significant impacts on landscape and views as a result of this option. The potential for significant visual impacts in particular is identified and these would be permanent. However, with sensitive landscapes, viewpoints and main settlements largely avoided, this impact would be reduced somewhat to a Moderate to High risk.

Cultural Heritage

There is a Moderate risk of significant impacts on cultural heritage as a result of this option. There would be a combined impact of the potential to encounter unknown archaeological assets during construction and the potential to impact the setting of built heritage assets during operation. Of these two potential impacts, however, the more significant impacts would be likely to arise on the setting of heritage features during operation.

Noise and Vibration

There is a low to moderate risk of significant impacts from noise and vibration as a result of this option. The construction of a new OHL and associated pylons would be likely to generate noise and vibration, most notably from works for pylon foundations. This noise impact would be temporary. There may also be some low levels of noise associated with the OHLs during operation. There is likely to be a greater impact in the area of Woodland substation due to its rural nature.

Climate Change

There is a Moderate risk of significant impacts to and from climate change as a result of this option. The OHL would be vulnerable to predicted future climate impacts associated with storms and winds and increased rainfall. Damage done could be difficult to repair as a result of increased flooding. This is a long-term risk and one that is predicted to increase over time. This would impact security of supply. The volume of material required to construct an OHL between Woodland and Finglas is significant and carries with it associated embodied energy.

5.4 Solution Option 2: New Finglas – Woodland 400 kV Underground Cable (UGC)

Option 2 involves a transmission network reinforcement to strengthen the network between the existing Woodland 400 kV substation in County Meath and the Finglas 220 kV substation in North County Dublin. The reinforcement consists of a new 400 kV UGC linking the Woodland 400 kV substation to the Finglas 220 kV substation, and a new 400 kV busbar and 400/ 220 kV transformer at Finglas.

Under Option 2, there are three key UGC solutions being investigated between Woodland and Finglas, including:

- Option 2A: One 400kV circuit standard cable type (2.5m^2 Cu XLPE installed in flat formation in a 1.7m wide trench);
- Option 2B: One 400kV circuit alternative cable type (3m^2 Cu XLPE installed in flat formation in a 2.1m wide trench); and
- Option 2C: Two 400kV circuits consisting of one 2.5m^2 Al XLPE cable per phase, installed as two circuits in trefoil formation in a single 1.7m wide trench.

5.4.1 Assumptions and Limitations

Within this review of the Finglas Study Area, particular attention is given to constraints associated with the highway network because EirGrid's preferred approach to the UGC solutions is to use the existing road network and bury cables in the roads.

The Cable Feasibility Report (document Reference 321084AJ002) identifies a number of typical constraints for UGCs:

- Bridges;
- Waterbodies;
- Railways;
- Other underground utilities; and
- Third party land.

This Section of the Environmental Constraints Report considers any river and canal crossings, and also roadside constraints such as ditches, hedgerows and buried or built heritage. The other constraints are addressed in the Cable Feasibility Report.

For this technology, the following assumptions have been made:

- All options may require up to a 12m construction swathe and so will be assessed together. There would be no difference in effects between them;
- The UGC will be installed in sections equal to the length of cable in each drum (700m). Welfare facilities and storage areas will be provided at the end of each section;
- Motorways and national roads would be avoided;
- The cables will be laid using the regional and local road network and as far as is reasonably practicable, will not cross third-party lands; exceptions to this include the potential for localised off-road sections as a result of obstacles such as small bridges (the locations of which are not known at this stage of the Proposed Project); and close to the connection at Woodland where it is likely it will have to as the local road network is not large enough to accommodate a 12m swathe and also because, the local road to the substation from R154 already carries the East West Interconnector DC cable;
- Congested urban centres and industrial estates would be avoided, insofar as possible;

- There are points along the routes with trees or mature hedgerows either side where the swathe will be reduced and limited to road surface, the verge either side and storage compounds would be positioned at either end of the section; and
- The cables would be connected into the substation as cables and there would be no requirement for OHL connections and the associated Sealing End Compounds at either end of the route.

There are limitations to the assessment:

- The route of the cable is not yet determined; and
- The technology that would be deployed to cross constraints such as rivers is not known. The cables would utilise existing road bridges to cross water bodies where possible, however it is likely that this will not be possible for smaller roads and so a short section 'offline' would be required and the water body crossed either using 'open-cut' or trenchless technologies, depending on its size and nature.

5.4.2 Potential Impacts and Risk Ratings for Option 2

Biodiversity, Flora and Fauna

In the absence of mitigation, potential effects on biodiversity during construction include:

- Temporary loss of terrestrial and aquatic habitat within the footprint of the Project to facilitate access roads and construction compounds;
- Disturbance, and temporary displacement of birds, mammals, amphibians, fish and other aquatic species from the working corridor and in proximity to the Proposed Project;
- Temporary habitat loss/fragmentation of foraging habitat for mammals such as badger and bat; and
- Pollution of surfaces waters, leading to secondary effects on aquatic species.

In the absence of mitigation, potential effects on biodiversity during operation include:

- Permanent loss of foraging, roosting, commuting and nesting habitat including fragmentation of wildlife corridors.

Disturbance to hedgerows, tree lines and associated species during construction is likely to be significant . There is likely to temporary loss of hedgerow habitats as they tend to line roads and therefore may require removal for the installation of UGC. These habitats also have the potential to support roosting bat species and breeding birds, and therefore these species may restrict the timing of construction activities. During operation any swathe of land excavated to accommodate the cable will be reinstated, however hedgerows and trees will not be replanted directly over the cable route and therefore this represents a potential permanent habitat loss and fragmentation of wildlife corridors. Passing bays will be reinstated with species-rich hedge and verge mixes, therefore, hedgerow loss lining roads will be temporary until the replanted hedges become established.

During construction there is the potential for temporary habitat loss and disturbance impacts on wintering birds however it is considered that the Finglas Study Area is out with the main ornithological hotspots connected with the east coast SPAs.

Noise and human activity during construction could cause disturbance to foraging and roosting wintering bird species utilising supporting habitat within the Finglas Study Area.

Any cable routes that are required to cross watercourses could potentially disturb or damage aquatic or riparian habitat in the construction footprint.. Trenchless crossing techniques for the larger rivers would have lower likelihood of impacts but there are still risks associated with this technique. Given that all water bodies within the Finglas Study Area are hydrologically connected to coastal European sites, there is potential for downstream impacts to these sites.

Where the UGC has to be routed off the road surface or across third party lands e.g. Woodland and Finglas substation, this may involve temporary habitat loss during construction and permanent habitat loss over the cable route.

Colour Coding for MCA - Biodiversity

Therefore, the risk of a potential impact to biodiversity is considered to be Low to Moderate in the absence of mitigation..

Biodiversity

Soils and Water

Geology, Soils and Groundwater

It is not anticipated that there would be significant impacts on geology, soils or groundwater during construction, given the assumption that the UGC routes would be mainly routed within public roads. The only potential risk area would be at the connection into Woodland substation and Finglas substation where the UGC may have to cross third-party land due to physical constraints along the local road network coming into the Woodland substation and the close proximity of the M50 Motorway and the N2 National Road to the Finglas substation.

The greatest potential for impacts is at the connections into both substations, if third party land is required to be crossed. In closer proximity to Finglas, land is previously developed and has been in use for industrial purposes over a number of years. There is potential for contaminated land to be encountered in third party lands and a pathway to groundwater or surface waters created by the cable trench.

No impacts would be anticipated for any option during operation.

Surface Water

There are a number of potential impacts on surface water during construction of an UGC. There would be no impacts predicted during operation.

During construction, generic impacts on surface water would include:

- Silty water runoff: surface water and dewatered groundwater containing high loads of suspended solids from construction activities. This includes the stripping of topsoil during site preparation; the dewatering of excavations and the storage of excavated material;
- Runoff being contaminated by a spillage or leakage of oils and fuels stored on site or direct from construction machinery; In the event of a spillage, there is a high likelihood of groundwater contamination. the slopes created by overbridging may increase the likelihood of surface water pollution from a spill;
- Change in the natural hydrological regime due to an increase in discharge as a result of dewatering. This may include changes to surrounding groundwater flow, or contaminated soil from previous land uses being disturbed causing pollutants such as heavy metals to enter ground and surface waters;
- Discharges of contaminated water from tunnelling and or excavations;
- High alkalinity run-off as a result of concrete works; and
- Potential for disrupting local drainage systems due to diversions required to accommodate the construction works.

Without mitigation, there is the potential for significant impacts to surface water receptors during the construction phase.

Specifically, for the UGCs, the crossing of watercourses, all of which have a hydrological connection to coastal SACs, presents a significant constraint for all UGC options.

Various techniques could be deployed, such as for larger rivers and canals, it is expected that crossings would be trenchless, possibly through the use of horizontal directional drilling (HDD); for smaller rivers and ditches, open-cut techniques are more likely, and these present the potential for greater impacts on the waterbodies as a result of impacts on riverbanks and the potential during construction for the cable trench to act as a conduit for silty water runoff into local rivers and streams. In addition, many of the local roads in the Finglas Study Area have open drainage ditches alongside them, which are hydrologically connected to the larger water bodies which are connected to the SACs.

The risk to water bodies from the potential impacts resulting from silt and spillages during the construction process would be Moderate, as there are 13 waterbodies in the Finglas Study Area which may be crossed by UGCs at least once, and there will be many smaller unnamed ditches and drains. There is also the potential for impacts on roadside ditches during construction. In addition, if the UGCs were to be installed in third party lands, there would generally be a greater level of open cut crossings and so risks would be higher.

Flood Risk

The installation of the UGCs via a trench has the potential to disrupt surface water flows and provide a conduit to direct water to areas where flood risk may be increased, however since the preference is for cable sot be laid within the public road network this is not likely to be an issue in this case. There would be a requirement to cross several rivers and streams in the Finglas Study Area, some of which may be susceptible to flooding. This could cause difficulties during the construction phase and increase the risk of both flooding to and from the works, in addition to increasing the likelihood of silty water runoff.

The stockpiling of excavated material alongside a trench may also act as a 'bund' and cause either localised pooling of surface waters on land or a diversion into rivers and streams with insufficient capacity to receive it, which has the potential to cause localised flooding.

Therefore, there is a low to moderate risk of potential significant flood risk impacts

It is not anticipated that there would be impacts on flood risk during operation, as the UGCs will be installed in the road network, wherever feasible. Any crossings of rivers by 'cable bridge' technique could pose a flood risk. However, it is assumed at this stage that the crossings would be either in existing road bridges or installed under water bodies via open cut and trenchless techniques; cable bridges would not be required.

Colour Coding for MCA – Soils and Water Combined

Therefore, there is a Moderate risk of potential significant impacts on soils and water.

Soils and Water

Material Assets – Planning Policy and Land Use

Planning Policy

As with Solution Option 1, there is the potential for interactions with various plan zonings within the Study Area for this Solution Option. This includes the strategic reserve and major town centre/light industrial/technology zonings to the north of Dunboyne and coming into the Fingal area. However, due to the nature of underground cables and the assumption that the routes would be mainly routed within public roads, these are substantially reduced.

Plan policies within the area support the principle of electricity conveyance improvement and reinforcement development within the Finglas Study Area to support regeneration and growth initiatives and policies , and pro-

actively favour UGCs, with both councils having a policy seeking to ensure the undergrounding of cables (INF POL 50 in Meath CDP, Objective DMS139 in FDP).

Improving capacity to the outlying areas of the wider Dublin area is also beneficial for the increased emphasis on 'High Technology' development within the zonings present in the Finglas Study Area. Potential impacts can be minimised with appropriate routing and early engagement with Planning Authorities. Therefore, there is a Low risk of potential significant impacts in terms of planning policy.

Significant Planning Application/Proposed Developments

There is potential for limited impacts upon the various granted, ongoing or forthcoming planning applications within the Study Area, be they residential, employment or strategic infrastructure. However, in terms of siting and potential visual impact, these are substantially reduced with the assumption that routing will mainly follow public roads. Additionally, potential impacts to applications granted or currently being determined can be significantly mitigated through appropriate routing, and robust planning application monitoring can ensure forthcoming applications will be quickly identified and taken into account. Overall, there is a low risk in terms of planning applications.

Land Use

There will be limited impacts on land use as a result of Option 2, as the routing of UGCs will predominantly be along the road network, insofar as possible. There will be temporary impacts on the regional road network during construction, as carriageway closures would be required to accommodate the works. However, full reinstatement of all roads following the installation of the UGCs would ensure that these impacts would not be permanent. At the connections into Woodland and Finglas, there is the potential that the cable would have to be installed across third party land. This would require significant temporary land take during construction, but limited during operation, although a permanent wayleave and some restriction of agricultural practices above the UGC is likely. There would be lower real or perceived impacts on land values as a result of an UGC, however the restrictions on agricultural practices and the effective sterilisation of some land which may otherwise be developed, mean that impacts are likely to be similar to those for an OHL option.

On the basis that most of the UGC would be I public roads, there is a Low to Moderate risk of potential significant impacts to land use.

Colour Coding for MCA – Planning Policy and Land Use Combined

For Option 2, the combined risks to planning policy and land use are considered to below to moderate.

Planning Policy and Land use

Landscape and Visual

There would be some, but limited, impacts on landscape and views during construction of the UGC from temporary machinery and compounds. However, the use of the regional and local road network for most of the route, and the use of appropriate screening by fencing during construction, means the impacts would not be significant for the majority of the route.

There may be the potential for routing across third party land for the Woodland and Finglas substation connections and this would result in the loss of some hedgerows. These effects could be permanent as it is EirGrid and ESB policy to not replant such vegetation over cables.

During operation, the UGC itself would have limited impacts on landscape and views, once reinstatement is completed. There would likely be joint boxes along the route which would affect both but these effects are not expected to be significant.

Colour Coding for MCA – Landscape and Visual

Therefore, there is a Low to Moderate risk of potential significant impacts to landscape and visual.

Landscape and Visual

Cultural Heritage (Archaeological and Architectural Heritage)

In general terms, the routing of an UGC presents a greater risk to unknown archaeology than the routing of an OHL. This is due to the greater extent of ground disturbance required for a construction working width and the excavation of trenches required to lay UGCs. The greatest impacts would be during construction and in particular the connections into the substations where there is the potential requirement to cross third-party land. This presents a greater risk to heritage assets, especially unknown archaeological assets, than installation in the regional road network. If any HDD is undertaken, sub-surface archaeological remains could be damaged or destroyed. If HDD is used, it is likely to be where there are significant physical constraints, such as roads, railways or waterways.

There would be limited impacts on heritage assets during operation. The joint bays required along the UGC route may affect the setting of some valued assets. However, in general terms, the UGC would not have a significant impact on heritage during its operation.

Further investigation and surveys would be required to determine the exact nature of the cultural heritage assets in the Finglas Study Area.

Colour Coding for MCA – Cultural Heritage (Archaeological and Architectural Heritage)

Therefore, there is a Low to Moderate risk of potential significant impacts to cultural heritage assets.

Cultural Heritage

Noise and Vibration

The construction of a new UGC would be likely to generate noise and vibration along the general construction working width, most notably from excavating trenches for cables, particularly in areas of hardstanding along roads. However, this would be temporary in nature. There would be no noise impacts anticipated during the operation of the UGC, as this will be buried.

There is likely to be a greater impact in the area of Woodland substation due to its rural nature, but moving across toward Finglas, the impact is not likely to be significant considering the current level of noise experienced in this area due to its close proximity to the major road network and Dublin Airport. The assumptions of the assessment are that the new UGC will be installed in the road network, wherever feasible. This will minimise the impact of construction related noise, due to a generally higher baseline noise level along road networks compared to rural areas. In addition, impacts will be temporary during construction only; it is assumed that appropriate screening will also be provided to reduce the potential for noise nuisance impacts to occur.

Colour Coding for MCA – Noise and Vibration

Therefore, there is a Low to Moderate risk of potential significant impacts due to noise and vibration.

5.4.2.1.1.1.0 Noise and Vibration

Climate Change

Overview of Potential Impacts

In terms of the potential impacts of the four options, consideration is given to:

- Climate resilience: new energy infrastructure is a long-term investment and will need to remain operational over many decades, in the face of a changing climate; and
- Material use/embodied carbon

Climate Resilience

In terms of climate resilience, consideration has been given to the vulnerability of a UGC to potential impacts of climate change such as:

- Flooding; and
- Earth movement or subsidence caused by flooding or drought.
- Changes in ground temperature potentially reducing efficiency ratings of the cable.
- UGCs are potentially vulnerable to earth movement and subsidence, as they are buried underground. UGCs are less vulnerable to flooding, winds and storms and subsequent transmission losses. Flooding is only considered a potential impact in terms of accessibility to UGCs for repairs, if required.
- The shortest UGC from Woodland to Finglas would be a straight line between the two and would be approximately 19km, however it could be up to 29km. It would not be possible to achieve the shortest route given the existing constraints.

Overall, there is a Low to Moderate risk in terms of climate resilience as UGCs will be buried underground.

Materials Use

The Solution Option requires a single trench, approximately 2m wide, and three cables laid within concrete. The trenches are typically 1.5m deep, of which approximately 0.5m would be concrete, the remainder backfilled with material taken from the trench initially, wherever possible.

Taking an average potential cable route at approximately 25km, this would require 75km of insulated cables. With a diameter including insulation of 128mm, this quates to approximately 985m^3 of cable material and approximately 75,000m^3 of concrete. Whilst this would amount to a relatively small proportion of the total carbon budget for Ireland, this is a large amount of material. Since a reduction in greenhouse gas emissions is required, this would be a Low to Moderate risk of a significant impact.

Colour Coding for MCA – Climate Change

Taking into account the resilience to climate change and the Low to Moderate risk of significant impacts to the UGC from climate change . and the Low to Moderate risk of significant impacts to greenhouse gas emissions as a result of the embodied energy in the materials proposed to be used the materials required for both the pylons and conductors, it is considered this presents an overall Low to Moderate risk in terms of materials use and embodied carbon.

Climate Change

5.4.3 Summary of Environmental MCA for Option 2

The greatest risks to the environment from this option are on soil and water, owing to the high number of water bodies in the study area, the likelihood of having to come off-road to cross them in the more rural areas and the number of roadside ditches present. For other environmental aspects the risks are low to moderate that this option would cause significant impacts; for all topics any risk would be during construction and therefore of a temporary nature. UGC are in accordance with local planning policy ambitions and are more resilient to the impacts of climate change. As a result, this option has an overall low to moderate risk of significant impacts on the environment

More Significant/ Difficult/ Risk Less Significant/ Difficult / Risk

Table 5.10: Option 2 Constraints Risk Assessment

Topic	Option 2 UGC Woodland to Finglas
Biodiversity	**Low to Moderate**
Soil & Water	**Moderate**
Planning Policy and Land Use	**Low to Moderate**
Landscape & Visual	**Low to Moderate**
Cultural Heritage	**Low to Moderate**
Noise and Vibration	**Low to Moderate**
Climate Change	**Low to Moderate**
Summary	**Low to Moderate**

Biodiversity

There is a low to moderate risk of significant impacts on biodiversity as a result of this option. In the absence of mitigation, the greatest effects on biodiversity would be during construction, where despite cables primarily being laid in public roads, there is potential for impacts on hedgerows, tree lines and aquatic ecosystems; other habitats and species may also be disturbed or fragmented during the construction phase and effects could be permanent in some cases. There is also the potential for permanent loss of mature trees along the route, especially where roads are very narrow or where the UGC is required to cross fields and hedgerows off-road.

Soils and Water

There is a moderate risk of significant impacts on soils and water as a result of this option. The greatest impacts would be during construction . The risk to water bodies from silt and spillages during the construction process would be Moderate as there are a number of waterbodies in the Finglas Study Area which would need to be crossed; it would not always be possible to use existing bridges for this purpose and in these cases it would be necessary to go off-road and use other crossing techniques such as open cut trenches. There is also the potential for impacts on roadside ditches during construction.

Materials Assets - Planning Policy and Land Use

There is a low to moderate risk of significant impacts on planning policy and land use as a result of this option. This option supports the ambitions of local planning policy for new transmission infrastructure to be underground where possible. There is the potential for the sterilisation of land where a UGC crosses third party lands, however that would be limited as a result of the preference to use public roads. This preference also reduces the level of land take required, except at the connections into Woodland and Finglas: here there is the potential that the cable would have to be installed across third party land, requiring significant temporary land take during construction.

This land take would be limited during operation, although a permanent wayleave and some restriction of agricultural practices above the UGC is likely.

Landscape and Visual

There is a low to moderate risk of significant impacts on landscape and views as a result of this option. The impacts would be greatest during construction, but this impact would be temporary in nature. During operation, the impacts would be limited. There would be visible joint boxes periodically along the UGC route, although these would be quite small. There may also be some requirement for third party land take and permanent loss of mature trees and hedgerows at points along the route and connections to the substations.

Cultural Heritage

There is a low to moderate risk of significant impacts on cultural heritage as a result of this option. The impacts on cultural heritage from the UGC would be greatest during construction, both in terms of ground disturbance and impacts on the settings of heritage assets. The crossing of third-party lands at the substations presents a greater risk to heritage assets, especially unknown archaeological assets, than installation in the regional road network.

Noise and Vibration

There is a low to moderate risk of significant impacts from noise and vibration as a result of this option. Potential noise and vibration impacts from the UGC would be during the construction phase and would result from the trench works, particularly in areas of hard-standing, such as along roads. However, the baseline noise environment along roads is higher than that of rural areas, and as such, the impact is not likely to be significant. There may be a slightly greater impact at Woodland substation due to the rural nature of the area, but appropriate noise screening will be provided to minimise any noise nuisance. No impacts are anticipated during the operational phase, as the cable will be buried.

Climate Change

There is a low to moderate risk of significant impacts on and from climate change as a result of this option. UGCs are reasonably resilient to the impacts of climate change, such as storms, wind and rain, although changes in ground temperature and reduced moisture may have impacts on the efficiency of the cables. The volume of material required to construct an UGC between Woodland and Finglas is significant and carries with it associated embodied energy.

6. Woodland to Belcamp Solutions

6.1 Woodland Substation to Belcamp Substation Study Area

The Woodland substation to the Belcamp substation Study Area (hereafter referred to as the Belcamp Study Area) incorporates the same area as the Project Study Area discussed in Section 2.1 (and is outlined in Figure 6-1).

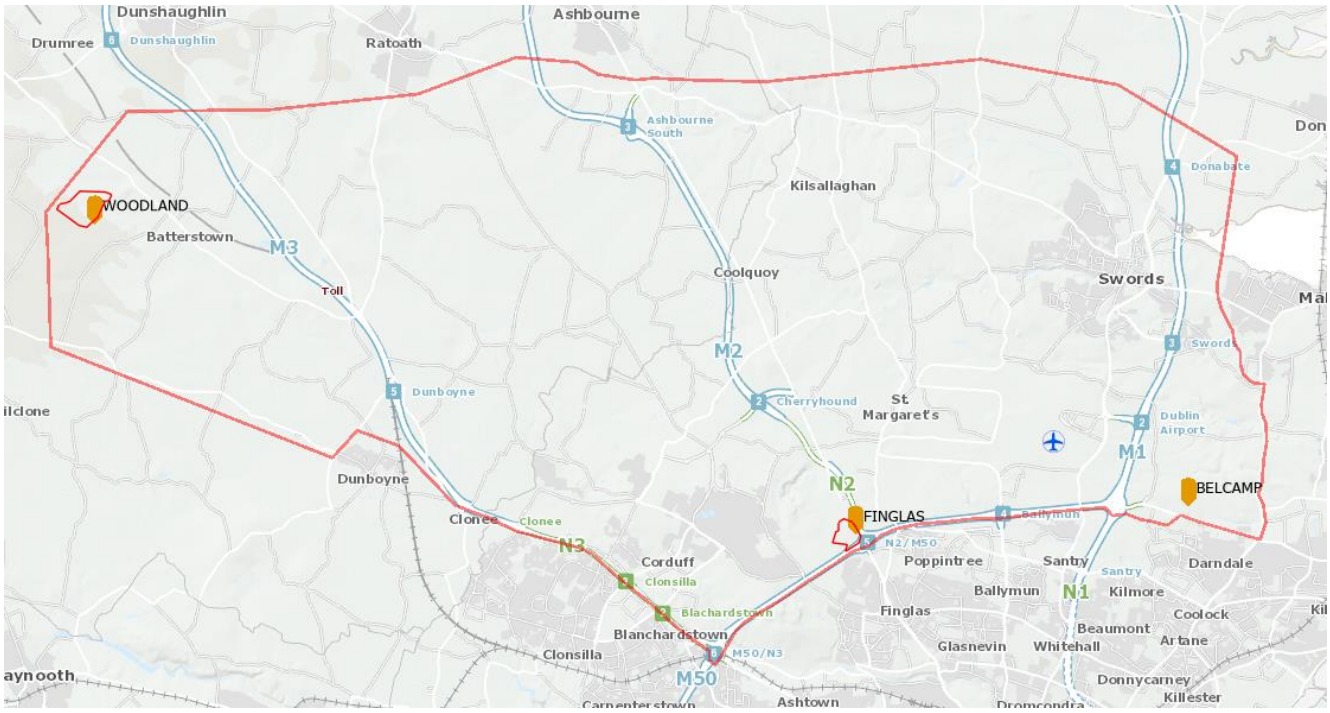

Figure 6-1 Belcamp Study Area

The Belcamp Study Area has been influenced by EirGrid's policies and guidance on routing and infrastructure. Whilst a 'straight line' between Woodland and Belcamp would present the shortest route with the fewest turns, it would also encounter a significant number of constraints, including settlements and designated / protected cultural heritage sites. The Belcamp Study Area has therefore been set wide enough to allow for the avoidance of environmental and social constraints. In addition, for certain constraints, consideration is given to areas outside of the Belcamp Study Area; for example, in the case of birds which may move across the area during migration or during more localised movements

6.2 Belcamp Study Area Baseline Environment

6.2.1 Biodiversity, Flora and Fauna

Biological constraints are shown in Appendix A, document reference 321084AJ-MAP-002

There are two internationally designated sites within the Belcamp Study Area. Malahide Estuary SAC and SPA are located in the north-eastern corner. As noted above for the Finglas Study Area, Malahide Estuary SAC is designated for several Annex I coastal and estuarine habitats, including:

- Mudflats and sandflats not covered by seawater at low tide;
- Salicornia and other annuals colonising mud and sand;
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae);
- Mediterranean salt meadows (*Juncetalia maritimi*);
- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes); and
- Fixed coastal dunes with herbaceous vegetation (grey dunes) (a priority habitat listed in the Habitats Directive).

Malahide Estuary SPA is designated for nationally and internationally important wintering bird populations and wetland habitats:

- Great Crested Grebe (*Podiceps cristatus*);
- Light-bellied Brent Goose (*Branta bernicla hrota*);
- Shelduck (Tadorna tadorna);
- Pintail (*Anas acuta*);
- Goldeneye (Bucephala clangula);
- Red-breasted Merganser (*Mergus serrator*);
- Oystercatcher (Haematopus ostralegus);
- Golden Plover (Pluvialis apricaria);
- Grey Plover (Pluvialis squatarola);
- Knot (Calidris canutus);
- Dunlin (Calidris alpina);
- Black-tailed Godwit (*Limosa limosa*);
- Bar-tailed Godwit (*Limosa lapponica*);
- Redshank (*Tringa totanus*); and
- Wetland habitats.

Several other European Sites are present in the vicinity of the Belcamp Study Area including Baldoyle Bay SAC; North Dublin Bay SAC; Howth Head SAC; Baldoyle Bay SPA; North Bull Island SPA; South Dublin Bay River Tolka Estuary SPA; Rockabill to Dalkey Island SAC; Ireland's Eye SAC; South Dublin Bay SAC; Rogerstown Estuary SAC; Lambay Island SAC; Ireland's Eye SPA; Howth Head Coast SPA; Rogerstown Estuary SPA; Lambay Island SPA; Dalkey Islands SPA.

The Belcamp Study Area is potentially hydrologically linked to several European and Ramsar sites via the River Tolka_060, River Santry_010, Broadmeadow_040, Ward_040, River Gaybrook_010, River Turvey_010, River Sluice_010 and River Mayne_010, namely:

- Malahide Estuary SPA and SAC;
- Baldoyle Bay SPA/ SAC;
- North Bull Island SPA;
- North Dublin Bay SAC;
- South Dublin Bay and River Tolka Estuary SPA;
- Baldoyle Bay Ramsar site;
- North Bull Island Ramsar site; and
- Broadmeadow Estuary Ramsar site.

There are no designated sites in close proximity to Woodland Substation. Baldoyle Bay SAC and SPA are the closest designated sites to Belcamp Substation and are c. 4km to the east.

There are no NHA sites within the Belcamp Study Area, but this Study Area also includes the following other important sites for biodiversity:

- Biodiversity-rich hedgerows and trees throughout (to a greater extent than that of the Finglas Study Area);
- Ancient and long established woodland at Abbotstown;
- Several wetland habitats which could support several Special Conservation Interest species of the SPA;
- Feltrim Hill pNHA;
- Royal Canal pNHA;
- Other designated sites co-incident with those of European sites (Malahide Estuary pNHA; Baldoyle Bay Ramsar site; North Bull Island Ramsar site; and Broadmeadow Estuary Ramsar site)

Light-bellied Brent goose is a particular feature of interest within the Belcamp Study Area. Dublin Bay is the most important site for Brent geese in the Republic of Ireland providing reliable access to food, water and a safe roosting location. Brent geese will preferentially use foraging sites close to their roost site if available and that their preferred ranging distance is to foraging areas within 3km of their roost sites. However, the Dublin flock are known to use the amenity grassland throughout Dublin City and farmland throughout the hinterland. The birds particularly use Dublin Bay coast and particularly North Bull Island SPA for roosting. The Belcamp Study Area contains supporting habitat for Brent goose. Several records exist for Brent goose within the Belcamp Study Area including around Malahide Estuary and Belcamp and land east of the M1 Motorway. Malahide Estuary is of particular note within this Study Area due to its location and the importance of the site for wintering waterfowl.

6.2.2 Soils and Water

Geology, Soils and Groundwater

Geological soils constraints are shown in Appendix A, document reference 321084AJ-MAP-003. Soils constraints are shown in Appendix A, document reference 321084AJ-MAP-008. Groundwater constraints are shown in Appendix A, document reference 321084AJ-MAP-005.

The Belcamp Study Area is mainly comprised of soils containing fine loamy drift with limestones associated with the Straffan Association (including the area at Woodland substation) and the Elton Association (including the area at Belcamp substation). There are also some areas of fine loamy drift with siliceous stones to the east and north-west of Swords. There are significant urban (manmade) areas, particularly at Dublin Airport and Swords.

The main subsoil type in this Study Area is limestone till (carboniferous), including the area at Belcamp substation. To the west, particularly around Woodland substation, the subsoils are mainly comprised of shale and sandstone till (Namurian) with an area of alluvium to the north of the substation. There are also some small pockets of

limestone sands and gravels, alluvium, and bedrock at surface, particularly in the vicinity of Huntstown Quarry, and a small area of sandstone at Malahide Estuary.

There are two Geological Heritage Sites within the Belcamp Study Area; Huntstown Quarry to the immediate west of the N2 National Road and Feltrim Quarry to the south of Swords.

There are four groundwater bodies in the Belcamp Study Area. The majority of the Belcamp Study Area (including Woodland substation) is comprised of 'Locally Important Aquifer' with bedrock that is 'Moderately Productive only in Local Zones'. There are also some areas of 'Poor Aquifer' with bedrock that is 'Generally Unproductive except for Local Zones' in the south and eastern sections of the Belcamp Study Area, including at Belcamp substation. The Belcamp Study Area mainly comprises low vulnerability aquifer to the west (including Woodland substation) and smaller areas to the east (including Belcamp substation). There is a mixture of Moderate, High and Extreme vulnerability aquifer, and Rock Near or at Surface in the central section of the Belcamp Study Area.

There is one karst landform, a spring, to the south-east of the Belcamp Study Area at St. Doolaghs, but this is approximately 2km to the north-east of Belcamp substation.

There is one Public Water Scheme in the Belcamp Study Area at Dunboyne which is located to the south-west.

Surface Water

Surface water constraints are shown in Appendix A, document reference 321084AJ-MAP-004.

The Belcamp Study Area straddles between the Liffey and Dublin Bay catchment 09 to the south, and catchment 08 Nanny-Delvin to the north. The following sub-catchments are present within the Belcamp Study Area:

- 08_3 Broadmeadow_SC_010;
- 08_6 Ballough Stream_SC_010;
- 09_4 Tolka_SC_020;
- 09_10 Tolka_SC_010; and
- 09_17 Mayne_SC_010.

Woodland substation is located within sub-catchment 09_10 Tolka_SC_010 and Belcamp substation is located within sub catchment 09_17 Mayne_SC_010. Within the study there are 20 surface waterbodies present, as outlined in Table 6.1. The surface water flows from west to east discharging into Malahide Estuary, Mayne Estuary, Broadmeadow Estuary and Tolka Estuary. It is important to note the current pressures that surface waterbodies in the Belcamp Study Area are under. The WFD status of the water bodies vary from Moderate to Poor, with 11 waterbodies of Poor status, 4 of Moderate status and 5 Unassigned. Of these 20 surface waterbodies, 16 are at risk of not meeting their WFD objectives. The main significant pressures are agricultural sources, urban wastewater, domestic wastewater and hydromorphology as a result of extensive modifications from flood alleviation works.

No waterbodies within the Belcamp Study Area are designated as SACs. However, all are hydrologically connected to SACs and/or SPAs. Proximity to the nearest designated site is provided. Six water bodies are within the 2km downstream limit identified in the UK's (England) Environment Agency and Planning Inspectorate English planning guidance on WFD Assessment (used in the absence of Irish guidance) (Planning Inspectorate 2017) for scoping a Protected Area. The remaining waterbodies are located greater than approximately 5km, and would not be considered close enough to change the sensitivities of the waterbodies within the Belcamp Study Area in the determination of impacts during an environmental impact assessment.

Table 6.1: Surface Water bodies in the Belcamp Study Area

Sub-Catchment	Surface Waterbody	WFD Waterbody Status	At Risk Status	Key Pressures	Connectivity and Proximity to Designated Site
08_3 Broadmeadow_SC_010	Fairyhouse Stream_010	Poor	At Risk	• Urban runoff • Domestic wastewater • Agriculture • Hydromorphology	Approx. 12km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Broadmeadow_020	Poor	At Risk	• Urban runoff • Hydromorphology • Urban wastewater	Approx. 10.5km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Broadmeadow_030	Poor	At Risk	• Domestic wastewater • Agriculture • Hydromorphology	Approx. 11km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Broadmeadow_040	Poor	At Risk	• Urban wastewater • Agriculture • Hydromorphology	Directly upstream of Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Ward_010	Unassigned	Review (likely At Risk given pressures identified)	• Agriculture • Domestic wastewater • Hydromorphology	Approx. 13.5km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Ward_020	Moderate	At Risk	• Agriculture • Urban wastewater • Hydromorphology	Approx. 11km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Ward_030	Moderate	Not at Risk	• Urban wastewater • Anthropogenic pressures from golf course • Hydromorphology	Approx. 6km from Malahide Estuary SAC and SPA
08_3 Broadmeadow_SC_010	Ward_040	Poor	At Risk	• Urban runoff • Hydromorphology • Urban wastewater	Approx. 0.2km from Malahide Estuary SAC and SPA
09_10 Tolka_SC_010	Tolka_010	Moderate	At Risk	• Agriculture • Domestic wastewater	Approx. 22.6km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Dunboyne Stream_010	Moderate	At Risk	• Agriculture • Domestic wastewater	Approx. 18km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Tolka_020	Poor	At Risk	• Agriculture	Approx. 17km from South Dublin and River Tolka Estuary SPA

Sub-Catchment	Surface Waterbody	WFD Waterbody Status	At Risk Status	Key Pressures	Connectivity and Proximity to Designated Site
09_10 Tolka_SC_010	Pinkeen_010	Unassigned	At Risk	• Agriculture • Domestic wastewater	Approx. 15.5km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Powerstown Dublin_010	Poor	At Risk	• Agriculture	Approx. 14km from South Dublin and River Tolka Estuary SPA
09_10 Tolka_SC_010	Tolka_030	Poor	At Risk	• Industry	Approx. 12.5 km from South Dublin and River Tolka Estuary SPA
09_4 Tolka_SC_020	Tolka_040	Poor	N/A	• N/A	Approx. 8.7km from South Dublin and River Tolka Estuary SPA
09_17 Mayne_SC_10	Mayne_010	Poor	At Risk	• Urban runoff	Flows directly into Baldoyle Bay, SPA and SAC.
09_17 Mayne_SC_10	Santry_010	Poor	At Risk	• Urban wastewater • Urban runoff • Industry	Approx. 5km from North Bull Island
09_17 Mayne_SC_10	Gaybrook_010	Unassigned	N/A	• N/A	Flows directly into Malahide Estuary SAC and SPA.
09_17 Mayne_SC_10	Sluice_010	Unassigned	At Risk	• Anthropogenic pressures	Flows directly into Baldoyle Bay, SPA and SAC.
08_6 Ballough[Stream]_SC_10	Turvey_010	Unassigned	At Risk	• Urban wastewater • Agriculture • Diffuse sources runoff	Flows into Malahide Estuary SAC, SPA and Broadmeadow Estuary SAC, SPA.

Flood Risk

Fluvial flooding may be an issue in some areas of the Belcamp Study Area. Rivers at risk of flooding (10% AEP or High Probability) include the Sluice_010, Ward_040, Gaybrook_010, Santry_010, Ward_030, Ward_010, Pinkeen_010, Tolka_010, Dunboyne Stream_010, Fairyhouse Stream_010, Broadmeadow_030 and Turvey_010. There are some small pockets of areas at risk of pluvial flooding spread widely across the Belcamp Study Area. There is also a risk of coastal flooding (10% AEP or High Probability and 1% AEP or Medium Probability) in the north-eastern section of the Belcamp Study Area in the vicinity of Malahide Estuary.

There is no indication of historic fluvial or pluvial flooding at the Woodland substation and its immediate surrounding area. The Tolka_020 which is approximately 500m to 1km from Woodland substation is at risk of

flooding (10% AEP or High Probability). There is some indication of pluvial flooding (10% AEP or High Probability and 1% AEP or Medium Probability) to the west of Woodland substation (approximately 500m).

There is no indication of historic fluvial or pluvial flooding at the Belcamp substation. However, the Mayne_010 which is located to the immediate south of the Belcamp substation (approximately 150m) is at risk of flooding (10% AEP or High Probability). There is also some indication of pluvial flooding (10% AEP or High Probability and 1% AEP or Medium Probability) to the north of Belcamp substation (approximately 200m to 500m).

6.2.3 Material Assets – Planning Policy and Land Use

Regional Planning Policy

Eastern & Midland Regional Assembly Regional Spatial & Economic Strategy (RSES) 2019-2031

The Eastern & Midland Regional Assembly RSES highlights the fact that an increase in electricity demand is likely, due to increased population and economic development as well as a move away from the use of fossil fuels in the transport sector towards clean mobility. The RSES states that in order to decarbonise the Region by promoting a shift away from fossil fuels, it needs to, among other things support the expansion and upgrading of the grid with the aim of increasing the share of variable renewable electricity that the all-island system can accommodate.

Key general Regional Policy Objectives in support of the Proposed Development include RPO 10.20, which relates to supporting and facilitating electricity suppliers in order *"to serve the existing and future needs of the Region"* and RPO 10.22, which supports, *"the reinforcement and strengthening of the electricity transmission and distribution network to facilitate planned growth and transmission/ distribution of a renewable energy*".

In addition, RPO 10.23, commits to supporting EirGrid's Implementation Plan 2017-2022 and, in particular, to *"Support the installation of additional transformer capacity and increased circuit capacity to meet Dublin demand growth to strengthen the network for all electricity users and improve the security and quality of supply" (p.226)*

County Development Plans

Meath County Development Plan (Meath CDP) 2021 – 2027

As with the Finglas Study Area, the north-west of the Belcamp Study Area, which incorporates the Woodland substation, is located within County Meath. The principle for development for the proposed project is supported within the Meath CDP, which asserts that the sustainable future socio- economic growth of the County is dependent on ensuring high-quality, reliable service provision, upgrading and enhancing existing networks and strengthening the national grid.

The Plan also identifies a range of policies that support the delivery of electricity conveyance and supply within the county, as set out in Table 6.2.

Table 6.2: Relevant Meath CDP Policies

Policies	
INF POL 46	To support and facilitate the development of enhanced electricity and gas supplies, and associated networks, to serve the existing and future needs of the County and to facilitate new transmission infrastructure projects that may be brought forward during the lifetime of the plan including the delivery and integration, including linkages of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner.
INF POL 47	To co-operate and liaise with statutory and other energy providers in relation to power generation in order to ensure adequate power capacity for the existing and future business and enterprise needs of the County.
INF POL 48	To ensure that energy transmission infrastructure follows best practice with regard to siting, design and least environmental impact in the interest of landscape protection.
INF POL 50	To require that the location of local energy services such as electricity, be undergrounded, where appropriate.
INF POL 51	To seek to avoid the sterilisation of lands proximate to key public transport corridors such as rail, when future energy transmission routes/pipelines are being designed and provided.
INF POL 52	To seek to generally avoid the location of overhead lines in Natura 2000 sites unless it can be proven that they will not affect the integrity of the site in view of its conservation objectives i.e. by carrying out an appropriate assessment in accordance with Article 6(3) of the E.U. Habitats Directive.

The Plan also sets out an objective relating to the transmission network, which is to:

INF OBJ 50- To seek the delivery of the necessary integration of transmission network requirements to facilitate linkages of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner.

Another factor to take into consideration in terms of routing is Public Safety Zonings located within the Study Area relating to Dublin Airport and its flight paths. DM Objective 111 states:

DM OBJ 111- Development should be restricted which would give rise to conflicts with aircraft movements on environmental or safety grounds on lands in the vicinity of Dublin Airport and on the main flight paths serving Dublin Airport.

Early consultation with the relevant authorities will ensure the potential interactions between the proposed project and the airport safety zones are managed appropriately.

In addition to these policies, there are various Zoning Objectives and areas for proposed Master Plans identified within the Meath CDP that relate to parts of the Belcamp Study Area, described in Table 6.3.

Table 6.3: Relevant Meath CDP Zoning Objectives

Zoning Objective	Interaction with Belcamp Study Area
Ratoath: RA Obj 2 (Master Plan 33) and RA Obj 3 (Master Plan 34)	The Belcamp Study Area includes two areas to the south of Ratoath which have been zoned for two forthcoming Master Plans, subject to an approved Master Plan to be agreed with the Executive of the Planning Authority. The plan has also zoned land falling within these masterplan areas for specific uses, as follows: • E2 - General Enterprise and Employment • D1 – Tourism • WL - White Lands • A1 – Existing residential
Dunboyne/Clonee/Pace: DCEOBJ 9	The Belcamp Study Area includes areas to the north/north-east of Dunboyne, which has been zoned for three forthcoming Masterplans: • MP22 Lands at Dunboyne North • MP23 Lands at Bracetown/ Gunnocks • MP24 Lands at Pace townland between Piercetown and Bracetown, east of the M3 Motorway. The plan has also zoned land falling within these masterplan areas for specific uses, as follows: • E1 - Strategic Employment Zones (High Technology Uses) • E2 - General Enterprise and Employment • E3 - Warehousing and Distribution • F1 - Open Space • A2 – New Residential • C1 – Mixed Use
Kilbride: Zoning Objective E2	The village of Kilbride also falls within the Belcamp Study Area, which has areas zoned for E2 General Enterprise and Employment to the south of the village, as well as areas zoned as: • F1 – Open Space • G1 – Community Infrastructure • A1 – Existing Residential

Fingal Development Plan 2017-2023

The Finglas Study Area also incorporates parts of Fingal. The Fingal Development Plan (FDP) supports the principle of development for the proposed project, stating that the Council will work in partnership with service providers to facilitate the required enhancement and upgrading of existing infrastructure and networks.

The FDP sets out a number of objectives relevant to the Study Area, as set out in Table 6.4.

Figure 6-2: Relevant FDP planning objectives

Policies	
Objective EN22	Facilitate energy infrastructure provision at suitable locations, so as to provide for the further physical and economic development of Fingal.
Objective DMS139	Seek the placing underground of all electricity, telephone and TV cables in urban areas. It is the intention of the Council to co-operate with other agencies as appropriate, and to use its Development Management powers in the implementation of this policy.
Objective DA13	Promote appropriate land use patterns in the vicinity of the flight paths serving the Airport, having regard to the precautionary principle, based on existing and anticipated environmental and safety impacts of aircraft movements.
Objective DA15	Take into account relevant publications issued by the Irish Aviation Authority in respect of the operations of and development in and around Dublin Airport.
Objective DA16	Continue to take account of the advice of the Irish Aviation Authority with regard to the effects of any development proposals on the safety of aircraft or the safe and efficient navigation thereof.

As with County Meath, factors to take into consideration in terms of routing are the Public Safety Zones located within the Study Area relating to Dublin Airport and its flight paths, ensuring early consultation with the relevant authorities to manage potential interactions between the proposed project and the airport safety zones.

In addition, there are various Zoning Objectives identified within the FDP that apply to parts of the Belcamp Study Area Study Area. These are described in Table 6.4.

Table 6.4: Relevant FDP Zoning Objectives

Zoning Objectives	
CI -Community Infrastructure	Provide for and protect civic, religious, community, education, health care and social infrastructure
GE - General Employment	Provide opportunities for general enterprise and employment
HI - Heavy Industry	Provide for heavy industry
OS - Open Space	Preserve and provide for open space and recreational amenities.
HT - High Technology	Provide for office, research and development and high technology/high technology manufacturing type employment in a high quality built and landscaped environment
RA – Residential Area	Provide for new residential communities subject to the provision of the necessary social and physical infrastructure
ME - Metro Economic Corridor	Facilitate opportunities for high density mixed use employment generating activity and commercial development, and support the provision of an appropriate quantum of residential development within the Metro Economic Corridor
RW - Retail Warehousing	Provide for retail warehousing development
MC - Major Town Centre	Protect, provide for and/ or improve major town centre facilities
TC - Town and District Centre	Protect and enhance the special physical and social character of town and district centres and provide and/ or improve urban facilities
DA - Dublin Airport	Ensure the efficient and effective operation and development of the airport in Accordance with an approved Local Area Plan

Due to the Belcamp Study Area being much wider, it incorporates Swords and Malahide urban areas and their town centres which are zoned, affording them significant protection under the plan. In addition, there is a zoning for ensuring the efficient and effective operation of Dublin Airport via a Local Area Plan.

Also of particular note are three additional new residential zonings within the Belcamp Study Area, with one located to the north west of Swords, and two to the south/south-west of Malahide, respectively.

As with the Woodland to Finglas solutions, the Belcamp Study Area is in proximity to the Hansfield Strategic Development Zone (SDZ), an area of land designated by the Government to contain developments of economic or social importance to the State. Hansfield SDZ is described as a new sustainable community which includes residential development of approx. 3000 residential units as well as community amenities services and facilities.

This SDZ is acknowledged due to its relative proximity and potential for interactions with the Finglas Study Area in terms of residents travelling to and from the various economic areas located within the Study Area.

Dublin City Development Plan 2016–2022

The Belcamp Study Area also incorporates a small part of the Dublin City area. The Dublin Development Plan (Dublin City CDP) states that electricity demand is set to increase by over 80% by 2025 so a secure and reliable energy network is to be an important element for supporting economic development. To that end, the CDP asserts that Dublin City Council will support statutory providers of national grid infrastructure and will be open to the future requirements of these bodies in the upgrading and enhancement of existing networks.

Key Policies in the Dublin CDP are outlined in Table 6.5.

Table 6.5: Relevant Dublin City CDP policies

Policies	
SI31	To support and facilitate the development of enhanced electricity and gas supplies, and associated networks, to serve the existing and future needs of the city, and facilitate new transmission infrastructure projects that might be brought forward in the lifetime of this plan, subject to relevant Irish planning and European legislation including Article 6 of the Habitats Directive and/or environmental assessment.
SI32	To require that the location of local energy services such as electricity, telephone and television cables be underground wherever possible, and to promote the undergrounding of existing overhead cable and associated equipment, where appropriate.

Although comparatively minor compared to the other Council areas, the study area does interact with a number of Dublin City zoned lands. The zoning objectives for which are outlined in Table 6.6.

Table 6.6: Relevant Dublin City CDP zonings

Zoning Objectives	
Zone Z6: Employment/Enterprise Zones	To provide for the creation and protection of enterprise and facilitate opportunities for employment creation.
Zone Z9: Amenity/Open Space Lands/Green Network	To preserve, provide and improve recreational amenity and open space and green networks.
Zone Z1: Sustainable Residential Neighbourhoods	To protect, provide and improve residential amenities.

Appropriate siting will ensure the potential for impacts within the Dublin City Council Area can be kept to a minimum.

Local Area Plans

Dunboyne, Clonee, and Pace Local Area Plan 2009-2015

The Dunboyne, Clonee, and Pace LAP is a statutory document which contains guidelines as to how the Dunboyne/Clonee/Pace Corridor should develop over the Plan period. Key to this was the identification of a number of Zoning Objectives. The Key objectives falling within the Belcamp Study Area of particular note fall to the north of Dunboyne. These are identified in Table 6.7.

Table 6.7: Relevant Dunboyne, Clonee and Pace LAP Zoning Objectives

Zoning Objectives	
O1 / WL -Strategic reserve, White land	To provide for strategic employment uses predominantly for high end office development, to be developed on a phased basis, within the plan period.
M5 - Other mix of uses	To facilitate the phased development of a major town centre as designated in the Retail strategy for the Greater Dublin Area 2008-2016 in accordance with the provisions of a future framework plan
C3 - Office, business/technology park and related	To provide for light industrial and industrial office type employment in a high quality campus environment subject to the requirements of approved framework plans and the provision of necessary physical infrastructure.

Zoning Objectives	
C2.2 - General industry	To provide for industrial and related uses subject to the provision of necessary physical infrastructure

Ratoath Local Area Plan 2009-2015

The Ratoath Local Area Plan sets down the policy framework for the future growth of Ratoath. It consists of a written statement accompanied by a zoning and land use objectives map. It will guide development in the area until 2015 or until the Plan is amended or a new Plan is made. Zonings to the south of Ratoath lie within the Belcamp Study Area, which are identified in Table 6.8.

Table 6.8: Relevant Ratoath LAP Zoning Objectives

Zoning Objectives	
P1 - Agriculture	To provide for the continued development and expansion of the equine related activities.
D1 - Tourism	To provide for visitor and tourist accommodation and leisure facilities.
E1 - General industry	To provide for industrial and related uses subject to the provision of necessary physical infrastructure.

Of particular note is the zoning 1km to the south of the town relating to the enhancement and diversification of the existing equine industry centred around Fairyhouse Race course and Tattersalls.

Rivermeade Local Area Plan 2018

Rivermeade is a village within the Belcamp Study Area, located in a rural area of Fingal to the west of Swords. The Rivermeade LAP It sets out the agreed development strategy for the future proper planning and sustainable development, identifying the potential for, extent, and type of development that is appropriate to this village.

A number of zonings are set out in the Rivermeade Local Plan that fall within the Belcamp Study Area, the objectives for which are outlined in Table 6.9.

Table 6.9: Relevant Rivermeade LAP Zoning Objectives

Zoning Objectives	
Development Areas 1-11	Predominantly catering for new residential development at low (15-29 units per ha) or very low densities (>15 units per ha), on sites within the Village Development Boundary.
Local Services Development Area	Development of this area for mixed uses including residential, retail, commercial, employment and community uses.
Existing Development in the Village	Comprising mainly of an existing residential development where density is low.
Existing Open Space	Comprising the existing passive and active open spaces/recreation areas within the village and proposed extensions thereof.
Allotments	Plots of land made available for individual, non-commercial gardening.

Of particular note are the eleven development areas designated for new housing, recreation, and sustainable living facilities, ranging in size between 1.1ha and 6.55ha.

Dublin Airport Local Area Plan 2020

Dublin Airport has been acknowledged previously in terms of zoning within the Fingal Development Plan section. However, in terms of the Dublin Airport LAP, a relevant objective of particular note relates to the operational safeguarding of the Airport Environs:

OBJECTIVE OS01 Control the type and height of any structures that may be developed in the environs of the Airport (in consultation with the Irish Aviation Authority and Dublin Airport) in accordance with the Obstacle Limitation Requirements of Regulation (EU) No 139/2014 (EASA Certification Specifications), previously required under ICAO Annex 14 and which are depicted on the aerodrome operator's safeguarding map.

This will be particularly relevant for OHLs in terms of appropriate siting and design.

Significant Proposed Developments within the Finglas Study Area

There are a number of major projects proposed within the Finglas Study Area that are currently progressing through the planning system, or are under construction. These are listed in **Table 5.8**.

In addition, there are a significant number of other planning applications in the planning system for a variety of proposed developments, from residential extensions to new apartment complexes to new industrial or business premises. Of particular note, are proposals for new data centres; there is one, for example, immediately north of Finglas substation and an existing one close to Belcamp substation which is likely to require additional electrical infrastructure at Belcamp substation in the near future.

Table 6.10: National Infrastructure Provision

National Infrastructure Providers	Projects/ Programmes Already Aware of
EirGrid	North South Interconnector Kildare Meath Connection
Irish Water	Greater Dublin Drainage Ballycoolin to Kingstown Trunk water Main Regional Biosolids Storage Facility (nr Huntstown Power Station, Finglas) Blanchardstown Sewerage Upgrade Scheme (Tolka Park) – under construction
Transport Infrastructure Ireland (TII)	N3 M50 to Clonee upgrade works
National Transport Authority (NTA)	BusConnects Luas Finglas
Irish Rail	DART+ West
Dublin Airport	Second runway – under construction
Fingal County Council	East West Distributor Road, less than 100m north of Belcamp substation.

Land Use

The majority of the Belcamp Study Area is comprised of pastures and non-irrigated arable land. The land use surrounding the areas of Blanchardstown, Finglas, Dublin Airport and Swords becomes more urban in nature.

There are some pockets of complex cultivation patterns, discontinuous urban fabric and sports and leisure facilities. Moving toward Finglas in the south-east of the Belcamp Study Area, the land use becomes more urban in nature with industrial or commercial units, construction sites, green urban areas, discontinuous urban fabric. There are still some small pockets of pastures and complex cultivation patterns in this section. There is a mix of industrial or commercial units, discontinuous urban fabric and construction sites around Blanchardstown and Finglas to the south and Swords to the north-east of the Belcamp Study Area.

The land use immediately surrounding Woodland substation is pastures, with a pocket of non-irrigated arable land approximately 1.3km to the south-east. There is no forestry or any peat/ bogs present. The Trim Road is about 750m from Woodland substation. The land use immediately surrounding Belcamp substation is non-irrigated arable land and pastures. The R139 Regional Road is immediately to the south of the substation. There is also a railway crossing of the Dublin to Maynooth railway line in the west of the Belcamp Study Area in the vicinity of Dunboyne. Dublin Airport is also located in the Belcamp Study Area to the north-west of Belcamp substation.

6.2.4 Landscape and Visual

Landscape constraints are shown in Appendix A, document reference 321084AJ-MAP-006.

The majority of the western half of the Belcamp Study Area is located in Lowlands, including the South East Lowlands LCA at Woodland and surrounds and the Ward Lowlands LCA to the east of Woodland. The Tara Skryne Hills LCA lies to the immediate south-west of Woodland. The landscape of the South East Lowlands LCA is dominated by small fields, bounded by mature hedgerows, with clusters of woodland. The north-eastern section of the Belcamp Study Area comprises Rolling Hills with Tree Belts LCA, and the majority of the southern section of the Belcamp Study Area comprises Low Lying Agricultural LCA (including at Belcamp substation), with a smaller section of River Valleys/ Canal LCA to the south-west.

The Meath County Development Plan has assigned the South East Lowlands as Very High Value and Moderate Sensitivity, Tara Skyrne as Exceptional Value and High Sensitivity, the Royal Canal as High Value and Moderate Sensitivity, and the Ward Lowlands as Low Value and High Sensitivity. The FDP has assigned Low Lying Agricultural LCAs as Modest Value and Low Sensitivity, Rolling Hills LCAs as Modest Value and Medium Sensitivity, and the River Valleys/Canal LCA as High Value and High Sensitivity. These landscapes can absorb a certain amount of development once the scale and forms are kept simple and surrounded by adequate screen boundaries and appropriate landscaping to reduce impact on the rural character of the surrounding roads. Particular parts of high sensitivity areas have a low capacity to absorb new development.

There are a number of clusters of residential properties and larger settlements across the Belcamp Study Area: Batterstown is closest and to the east of Woodland substation; Dunboyne, Mulhuddart / Clonee and Blannchardstown are along the south west boundary of the Study Area; Corduff is in the south, close to Finglas substation; St. Margaret's is to the west of Dublin Airport; Swords to the north-east; and Malahide is just outside of the Study area on the coast to the east. At Woodland substation, the nearest sensitive receptors are individual residential properties to the south and east, approximately 1km to 2km in distance, respectively. At Belcamp substation, the nearest residential properties are to the south of the substation, across the R139 Regional Road. There are also hotels approximately 1km to the west of the Belcamp substation.

There are a number of scenic routes and viewpoints, notably around Malahide Estuary to the north-east of the Belcamp Study Area. The Belcamp Study Area becomes more built up and urban in nature and is more densely populated further to the east.

6.2.5 Cultural Heritage (Archaeological and Architectural Heritage)

Cultural heritage constraints are shown in Appendix A, document reference 321084AJ-MAP-007.

The Woodland and Belcamp substations are not directly situated on any features of cultural heritage importance. There are no World Heritage Sites in the Belcamp Study Area but it includes the following cultural heritage assets:

- There are a few NIAH sites within the Belcamp Study Area, at Batterstown, Hollystown, Buzzardstown, Rowlestown, Corristown, Roganstown, Rathbeale, and a large cluster of NIAH sites surrounding the settlement of Swords. There are two NIAHs to the immediate south-west of Belcamp substation (approximately 105m). There is one NIAH directly to the west of Belcamp substation, a detached three-bay, two-storey house which was damaged by fire. There is also one Designed Landscape to the immediate west of Belcamp substation that surrounds the NIAH;
- Meath and Fingal RPS sites are identified throughout the Belcamp Study Area. There is a small cluster to the north of Batterstown / east of Woodland substation, and larger clusters between the M2 and N2 corridors, to the north of Mulhuddart / Corduff and between the N2 corridor and the M1 corridor, most notably around the settlement of Swords. There is also a smaller cluster to the north-east of the Belcamp substation in the vicinity of St. Doolaghs.;
- National Monuments are relatively evenly and widely distributed throughout the Belcamp Study Area. There is a small cluster to the north of Batterstown / east of Woodland substation, and larger clusters between the M2 and N2 corridors, to the north of Mulhuddart / Corduff and between the N2 National Road corridor and the M1 Motorway corridor, notably around St. Margaret's, Kilsallaghan and Swords;
- There are two Architectural Conservation Areas (ACAs) in the Belcamp Study Area and both are within Fingal. The Abbeville ACA is located in the north of the Belcamp Study Area and the Rowlestown ACA is located in the east of the Belcamp Study Area, to the north-east of Dublin Airport; and
- Archaeological Resources and Areas of Archaeological Potential (AAP): There are AAPs widely distributed across the Belcamp Study Area. There are no recorded AAPs at Woodland or Belcamp substations. There is a cluster of AAPs to the north of Belcamp substation.

6.2.6 Noise and Vibration

Under S.I. No. 140/2006 – Environmental Noise Regulations 2006, county councils are designated as the responsible parties for the preparation of Noise Action Plans for the management and control of road, rail, major industrial and aircraft noise sources. Fingal County Council have developed a Noise Action Plan for Fingal County Council 2019 - 2023 and a separate Noise Action Plan for Dublin Airport 2019 - 2023. Meath County Council have also developed a County Meath Noise Action Plan 2019.

Noise pollution is considered to have a greater impact at certain locations and certain building types are considered to be more sensitive than others (i.e. residential properties, schools, hospitals and residential care facilities). The main sources of noise in the Belcamp Study Area include the M3 Motorway / N3 National Road and the M2 Motorway / N2 National Road to the east of Woodland substation, the M50 Motorway to the south of the Belcamp Study Area, the M1 Motorway to the west of Belcamp substation, and Dublin Airport, for which flight paths pass over the Belcamp Study Area. Dublin Airport is approximately 3.3km to the north-west of Belcamp substation.

At Woodland substation, the nearest sensitive receptors are residential properties to the south and east, approximately 1km to 2km in distance, respectively. As this area is more rural in nature, it would be more susceptible to noise impacts. There is no current noise monitoring in the vicinity of Woodland substation. The nearest modelled location is at the M2 Motorway approximately 3km to the north-east. At Belcamp substation, the nearest residential properties are to the south of the substation, across the R139 Regional Road. There are also hotels approximately 1km to the west of the Belcamp substation. The area is dominated by aircraft noise as the Belcamp substation is in the flight path of Dublin Airport, and noise from the R139 Regional Road to the immediate south of the substation. The noise levels experienced at the Belcamp substation due to the nearby road networks (notably the M1 and Motorway and the R139 Regional Road) is 55-59dB during the daytime and the noise experienced due to aircraft flying overhead is also 55-59dB during the daytime.

6.2.1 Climate Change

There is no local baseline for climate change. The baseline is taken to be as set out in Section 4.2.7.

6.3 Solution Option 3: New Belcamp to Woodland 400 kV Overhead Line (OHL)

Option 3 involves a transmission network reinforcement to strengthen the network between the existing Woodland 400 kV substation in County Meath and the Belcamp 220 kV substation in North County Dublin. The reinforcement consists of a new 400 kV overhead line linking the Woodland 400 kV substation to the Belcamp 220 kV substation, and a new 400 kV busbar and 400/ 220 kV transformer at Belcamp.

6.3.1 Assumptions and Limitations [TBC]

For this Option, the following assumptions have been made:

- The OHL options would be constructed using access tracks from local roads, no access track along the route corridor would be installed;
- Where bridges are required, temporary (ballie) bridges will be used; no intruding on the water bodies will be required. If possible, stringing will take place using other techniques across waterbodies; and
- The routing of an OHL would take flood plains into consideration and avoid, wherever possible.

There are limitations to the assessment:

- There are currently no defined routes for the OHL, and as such, this assessment considers a reasonable worst-case scenario whereby protected sites (for all environmental topics assessed in this Report), main settlements

and highly sensitive landscapes are generally avoided, but thereafter, the greatest potential impacts on environmental constraints are identified.

6.3.2 Potential Impacts and Risk Ratings for Option 3

Biodiversity, Flora and Fauna

As is described in Option1, in the absence of mitigation, potential effects on biodiversity during construction include:

- Temporary loss of terrestrial and aquatic habitat within the footprint of the Project to facilitate access roads and construction compounds;
- Disturbance, and temporary displacement of birds, mammals, amphibians, fish and other aquatic species from the working corridor and in close proximity to the proposed project;
- Temporary habitat loss/fragmentation of foraging habitat for mammals such as badger and bat; and
- Pollution of surfaces waters, leading to secondary effects on aquatic species.

Potential effects on biodiversity during operation in the absence of mitigation include:

- Permanent loss of habitat;
- Damage to habitats during maintenance;
- Collision and mortality risks for birds; and
- Permanent habitat loss within the footprint of the pylons. The risks to bats and birds from OHL are previously described in greater detail in Option 1 and the potential for these to occur for Option 3 are fully considered here.. . An OHL in the Belcamp Study Area includes all of the potential impacts identified for the Finglas Study area and has additional risk associated with a longer route and closer proximity to designated habitats along the coast. Of particular note is Malahide Estuary. As an SAC and SPA, a crossing of this site by an OHL could bring significant impacts both in construction and operation. A continuation of such an OHL towards Belcamp substation would also bring risks to birds in other designated sites along the eastern coast; it would potentially cross direct flight paths for birds coming inland to feed. The Brent goose is of particular concern in this regard.

In the absence of mitigation, potential impacts on trees would be permanent; there is a possibility for veteran trees within the Belcamp Study Area to be affected by a new OHL. Trees with the potential to interfere with the OHL (e.g. under or in close proximity to one) may need to be removed or trimmed.

Colour Coding for MCA – Biodiversity

Therefore, due to the potential impacts from Option 3 noted above, there is a High risk of potential significant impacts to biodiversity, in the absence of mitigation.

Biodiversity

Soils and Water

Geology, Soils and Groundwater

There would be limited impacts on soils and geology for most of the Belcamp Study Area. Potential impacts would be limited to construction, notably within the footprint of any pylons required. The OHL would not be routed across any karst landforms or sensitive soil types such as bog or peat, and therefore, it is not anticipated that the OHL between Woodland and Belcamp would have significant impacts on geology or soils during construction and there would be no predicted impacts during operation. However, the impact would be slightly greater than that of Option 1 as the length of the OHL, and therefore, the number of pylons required would be greater due to the increased distance between Woodland and Belcamp than that of Woodland and Finglas. Therefore, due to the potential

impacts from Option 3 noted above, there is a Low risk of potential significant impacts to geology, soils and groundwater, in the absence of mitigation.

Surface Water

There are a number of potential impacts on surface water during the construction of an OHL and none associated with the operation of an OHL.

During construction of the OHL, generic impacts on surface water would include:

- Silty water runoff: surface water and dewatered groundwater containing high loads of suspended solids from construction activities. This includes the stripping of topsoil during site preparation, the dewatering of excavations and the storage of excavated material;
- Runoff being contaminated by a spillage or leakage of oils and fuels stored on site or direct from construction machinery. In the event of a spillage, there is a high likelihood of groundwater contamination. The slopes created by overbridging may increase the likelihood of surface water pollution from a spill;
- Change in the natural hydrological regime due to an increase in discharge as a result of dewatering. This may include changes to surrounding groundwater flow, or contaminated soil from previous land uses being disturbed causing pollutants such as heavy metals to enter ground and surface waters;
- Discharges of contaminated water from tunnelling and or excavations;
- High alkalinity runoff as a result of concrete works; and
- Potential for disrupting local drainage systems due to diversions required to accommodate the construction works.

Without mitigation, there is the potential for significant impacts on surface water receptors during the construction phase. However, the potential impacts identified can be managed through the use of standard best practice techniques in construction and so it is not anticipated that significant impacts would occur.

In addition, with careful siting of towers, construction work would not need to be close to waterbodies apart from at crossing points. No bridges are required and that stringing could take place using other techniques across waterbodies. The impact would be slightly greater than that of Solution Option 1 as the length of the OHL, and therefore, the potential for more crossings required would be greater due to the increased distance between Woodland and Belcamp than that of Woodland and Finglas. Therefore, there is a Low risk of potential significant impacts to surface water.

Flood Risk

The new OHL would have a very limited potential for impact on flood risk during construction and there would be none during operation. There is no current history of flooding in the footprint of the Woodland or Belcamp substations. However, there is a potential for flooding to waterbodies in the surrounding areas, particularly in close proximity to Belcamp. Flooding has the potential to affect the construction of the OHL, but this would depend on the final route. A route across a flood plain could prove difficult or even unsafe at certain times of the year for construction, but the routing of an OHL would take these into consideration and avoid, wherever possible. The length of the route means that the construction and operation of the OHL would have the potential to interact with a large number of high flood risk areas. Therefore, there is a Low to Moderate risk of potential significant flood risk impacts.

Colour Coding for MCA – Soils and Water Combined

Therefore, there is a combined Low to Moderate risk of potential significant impacts to soils and water, in the absence of mitigation.

Soils and Water

Material Assets – Planning Policy and Land Use

Planning Policy

It is acknowledged that there are more potential interactions with various plan zonings within the Belcamp Study Area than the Finglas Study Area. Zonings include the strategic reserve and major town centre/light industrial/technology zonings to the north of Dunboyne and moving east coming into the Fingal urban area, incorporating Dublin Airport and its environs, as well as housing and employment zonings around Swords and Malahide.

While plan policies are broadly in support of electricity conveyance improvement and reinforcement development within the Finglas Study Area, they pro-actively favour UGCs, with all three councils having a policy seeking to ensure the undergrounding of cables (INF POL 50 in Meath CDP, Objective DMS139 in FDP, Policy SI32 in Dublin City CDP). Whilst the LPAs have a clear preference for UGCs, they are generally supportive of improved electrical infrastructure to support regeneration and growth initiatives and policies.

Improving capacity to the outlying areas of the wider Dublin area is also beneficial for the increased emphasis on 'High Technology' development within the zonings present in the Belcamp Study Area. Potential impacts can be minimised with appropriate routing and early engagement with Planning Authorities.

Therefore, there is a Moderate risk of potential significant impacts in terms of planning policy.

Significant Planning Application/Proposed Developments

There is potential for Solution Option 3 to have impacts upon the various granted, ongoing or forthcoming planning applications within the Study Area, be they residential, employment or strategic infrastructure, as Overhead Lines have added complexities in terms of siting and potential visual impact. In particular, there the planned expansion of Dublin Airport would need to be taken into account in terms of the increased airport footprint and protection granted for inappropriate development in the airport environs, as well as the proposed East West Distributor Road north of Belcamp substation. However, these potential impacts to applications granted or currently being determined can be significantly mitigated through appropriate routing, and robust planning application monitoring can ensure forthcoming applications will be quickly identified and taken into account.

Land Use

There would be limited impacts on land use as a result of Option 3. New OHL corridors would require limited and temporary land take for construction, with short access tracks from local roads being used, wherever possible. Permanent land take would be limited to the footprint of the OHL pylons. The main impact would be associated with construction, however there may be restrictions on land use going forward as a result of the OHL crossing certain types of land. Depending on the route, it could lead to sterilisation of development land, concerns relating to different agricultural practices, or impacts on property values. Solution Option 3 would have a slightly greater impact than Option 1 as the length of the OHL, and therefore, the number of pylons required would be greater due to the increased distance between Woodland and Belcamp than that of Woodland and Finglas. Land use is also more urban in nature moving to the east of the Belcamp Study Area which presents greater physical constraints. Perceived and actual impacts on land values would present significant constraints both in rural and urban areas. With careful routing of OHL in consultation wih communities and landowners, the risk of impacts would be reduced. There is no scope for installing OHL in public roads however as there is for UGC so almost all of the land use would be 3rd party lands. As a result there is a Moderate risk of potential significant impacts to land use.

Colour Coding for MCA – Materials Assets - Planning Policy and Land Use Combined

Therefore, there is a combined Moderate risk of potential significant impacts to planning policy and land use, in the absence of mitigation.

Planning Policy and Land Use

Landscape and Visual

A new OHL and associated pylons are likely to have an impact on the local landscape and views. Effects on landscape occur when there is considered to be a significant change in the landscape as a result of the introduction of a new structure and this significance depends upon the sensitivity of the landscape and the size or magnitude of the structure. The routing of a new OHL through a sensitive landscape is likely to have a significant impact on that landscape.

In terms of views, the sensitivity is that of the 'viewer' and the magnitude of the effect is determined by how prominent the structure is within certain views. A very large magnitude, for example, would command a view; a very small magnitude would be where the structure was not obvious or indistinct in views. In this regard, scenic routes and viewpoints are important or sensitive receptors, as are local communities, in particular residential dwellings. Some tourism sites may also depend upon views and would be considered sensitive receptors.

As stated previously, the majority of the western half of the Belcamp Study Area is located in the South East Lowlands LCA at Woodland and surrounds and the Ward Lowlands LCA to the east of Woodland. The north-eastern section of the Belcamp Study Area comprises Rolling Hills with Tree Belts LCA, and the majority of the southern section of the Belcamp Study Area comprises Low Lying Agricultural LCA (including at Belcamp substation), with a smaller section of River Valleys/ Canal LCA to the south-west.

The South East Lowlands are assigned Very High Value and Moderate Sensitivity, the Ward Lowlands as Low Value and High Sensitivity, the Low Lying Agricultural LCAs are assigned as Modest Value and Low Sensitivity and the Rolling Hills with Tree Belts LCA as Modest Value and Medium Sensitivity. OHLs are generally visible across large scale flat landscapes. The majority of views across the wider Belcamp Study Area would typically be experienced by individual properties and settlements within 1km of infrastructure, and impacts are likely to be greatest in the South-East Lowlands surrounding Woodland substation and the Ward Lowlands to the east of the substation which are assigned as Moderate and High Sensitivity landscapes, respectively. EirGrid Evidence Based Environmental Studies - Study 10: Landscape and Visual (EirGrid 2016b) considered the potential impacts of OHLs in different landscapes and for different heights of pylons (depending on whether 110, 220 or 400kV OHL) and concluded that significant visual effects from 400kV pylons occurred within 800m but the most significant were within 400m. No significant effects were found after 800m. In terms of landscape types, 400kV pylons were found best absorbed within urban and lowland agricultural landscapes but also high drumlin. Therefore, 400kV pylons were found best absorbed within lowland rural landscapes. Screening is not as effective at reducing prominence [in these areas] but the study emphasized the importance of 'routing of lines to maximise "backclothing".

The assumptions of the assessment are that the new OHL would avoid protected sites, main settlements and highly sensitive landscapes, wherever possible. There is still the potential for impacts on other landscapes and on views, both from designated viewpoints and from residential properties, particularly the smaller, linear communities that are present throughout the northern half of the Belcamp Study Area. Option 3 would have the potential for a greater impact than Option 1, as the length of the OHL, and therefore, the number of pylons required would be greater due to the increased distance between Woodland and Belcamp than that of Woodland and Finglas. In addition, there are more scenic / amenity areas in the vicinity of Malahide Estuary in the Belcamp Study Area.

<u>Colour Coding for MCA – Landscape and Visual</u>

There is a High risk of potential significant impacts to landscape and visual receptors, in the absence of mitigation.

Landscape and Visual

Cultural Heritage (Archaeological and Architectural Heritage)

During construction, there is the potential for heritage assets to be affected, particularly unknown archaeology, during excavation works for pylon foundations. However, given the relatively small footprint of pylon foundations, it is during operation that the greatest potential for impacts occurs. There is also the potential for a new OHL to affect the setting of the heritage assets identified in the Belcamp Study Area. In particular, national monuments could be impacted as these are widely distributed throughout the Belcamp Study Area and present in significant clusters in some parts of the Belcamp Study Area.

The potential impact of Option 3 would be greater than that of Option 1, as the length of the OHL, and therefore, the number of pylons required would be greater due to the increased distance between Woodland and Belcamp than that of Woodland and Finglas.

Colour Coding for MCA – Cultural Heritage (Archaeological and Architectural Heritage)

There is a Moderate to High risk of potential significant impacts to cultural heritage assets, in the absence of mitigation.

Cultural Heritage

Noise and Vibration

The construction of a new OHL and associated pylons would be likely to generate noise and vibration along the general construction working width, and most notably from works for pylon foundations. This noise impact would be temporary. There is also the potential for low levels of noise associated with the OHLs during operation due to the electrical current passing through them.

There are a number of ways in which noise can be generated from electricity infrastructure. EirGrid Evidence Based Environmental Studies - Study 8: Noise (EirGrid 2016c) identified the following four categories of noise:

- Audible noise associated with "Corona Noise" from high voltage transmission lines – generally heard as crackling and hissing;
- Audible noise associated with dirty, damaged or cracked insulators;
- Audible noise associated substation equipment; and
- Audible noise associated with wind blowing through electricity infrastructure – this is called "Aeolian Noise".

The Study concluded that 400kV OHL produce significant 'Corona Noise' effects within 200m of the OHL, especially at night or under humid or wet conditions.

There is likely to be a greater impact in the area of Woodland due to its rural nature and relatively low baseline noise environment, but moving across toward Belcamp, the impact is not likely to be significant considering the current level of noise experienced in this area due to its close proximity to the major road network and Dublin Airport. The assumptions of the assessment are that the new OHL would avoid sensitive receptors, insofar as possible, and that appropriate screening would be provided for construction works to avoid generating noise nuisance.

Colour Coding for MCA – Noise and Vibration

Therefore, there is a Low to Moderate risk of potential significant impacts due to noise and vibration.

Noise and Vibration

Climate Change

Overview of Potential Impacts

In terms of the potential impacts of the four options, consideration is given to:

- Climate resilience: new energy infrastructure is a long-term investment and will need to remain operational over many decades, in the face of a changing climate; and
- Material use/embodied carbon.

Climate Resilience

In terms of climate resilience, consideration has been given to the vulnerability of an OHL to potential impacts of climate change such as:

- Flooding;
- Effects of wind and storms;
- Higher average temperatures leading to increased transmission losses; and
- Earth movement or subsidence caused by flooding or drought.
- OHLs are potentially vulnerable to flooding, winds and storms and transmission losses; they are less vulnerable to earth movement than other climate factors, however subsidence could impact upon pylon foundations and result in damage to the local network. Winds and storms are of particular concern to OHLs and there are a number of examples of OHL transmission networks being damaged during significant storms.
- Flooding is of concern mainly in terms of accessibility to OHL for repair; in the event of a storm causing damage to an OHL, access to it for repair would be hampered if a pylon were situated in a flood risk area and the storm also brought about localised flooding. Proximity to coastal areas and the potential for increased storminess presents additional risks to an OHL option to Belcamp substation.

The shortest OHL from Woodland to Belcamp would be a straight line between the two and would be approximately 25km. It would not be possible to achieve this route given the existing constraints and so it is likely that the route would be up to 35km. This length of OHL is at Moderate to High risk of significant impacts in relation to climate resilience.

Materials Use

A typical span between pylons for OHLs is approximately 350m; this is shortened or can be lengthened depending upon the necessity for turning or oversailing constraints. At up to 35km long, an OHL route to Belcamp substation would therefore require at least 100 pylons; given the constraints closer to Belcamp and the need to navigate around Dublin Airport where pylons would have to be shorter, taking into account the Public Safety exclusion Zones (see OHL Feasibility Report, document reference 321084AJ-REP-003), it is likely that the number in reality would be higher and there could be a number of 'angle pylons' which are larger than the 'normal' pylons used along a straight line stretch of OHL. Each pylon would also require concrete foundations of approximately 1,000m^3, amounting to 100,000m^3 of concrete for the route.

OHL conductors do not require to be insulated as this is provided by the air in which they are strung. This minimises the materials used in the transmission to that of the conductor only. The 400kV OHL would be a single circuit, with three conductors. This amounts to approximately 105km of conductor material. Whilst this would amount to a relatively small proportion of the ttal carbon budget for Ireland, this does present a greater risk with respect to embodied carbon than Solution Option 2 to Finglas because it is 30% larger. Since a reduction in greenhouse gas emissions is required, this would be a Moderate risk of a significant impact.

Colour Coding for MCA – Climate Change

Taking into account the Moderate to High risk of significant impacts relating to climate resilience, and the Moderate risk of significant impacts to greenhouse gas emissions as a result of the embodied energy in the materials proposed ot be used for both the pylons and conductors, it is considered this presents an overall Moderate to High risk.

Climate Change

6.3.3 Summary of Environmental MCA for Option 3

As with Option 1, the greatest risks of significant impacts as a result of this option are associated with biodiversity and landscape and views, which have a high risk rating. Again, this is as a result of OHLs posing a collision risk to migratory birds, a loss of mature trees and significant impacts on views. However, this option is closer to European protected areas along the coast and migratory routes for birds and is longer so has the potential to impact on more views than Option 1. This option also has the potential to conflict with local planning policies, impact on the setting of cultural assets and is less resilient to climate change than an underground option.

More Significant/ Difficult/ Risk Less Significant/ Difficult / Risk

Table 6.11 Option 3 Constraints Risk Assessment

Topic	Option 3 (New Belcamp to Woodland OHL)
Biodiversity	High
Soil and Water	Low to Moderate
Planning Policy and Land Use	Moderate
Landscape and Visual	High
Cultural Heritage	Moderate to High
Noise and Vibration	Low to Moderate
Climate Change	Moderate to High
Summary	Moderate to High

Biodiversity

There is a high risk of significant impacts on biodiversity as a result of this option. There is potential for impacts on protected sites as all of the water bodies in the study area are hydrologically connected to European designated sits on the coast at relatively close proximity as a connection approaches Belcamp substation, especially if it were to be routed from the north across the estuary at Malahide. There will be a permanent loss of habitat within the footprint of the pylons and as a result of a loss of some mature trees and there is a collision risk to birds migrating across the study area. These risks are greater than for Option 1 as the route is longer and is closer to designated sites and bird migratory routes. Although literature suggests that bird collisions with power lines are generally considered to be rare events, there is still potential for collision risk to bird species from the new OHL in addition to disturbance leading to displacement.

Soils and Water

There is a low to moderate risk of significant impacts on soils and water as a result of this option. The impacts would be only likely to occur during construction. These impacts would be fairly limited as Option 3 would aim to avoid designated water bodies and excavations would be limited to new pylon foundations. Short access tracks from local roads would be used, where possible, and would require minimal soil strip in site preparation. However, all water bodies in the study area are connected to designated sites on the coast and the potential for impacting these during construction increases as any OHL route approaches Belcamp. In addition, the increased size of the study area, length of the OHL and number of pylons required increases risks to water bodies for this option compared to Option 1.

Material Assets - Planning Policy and Land Use

There is a moderate risk of conflict with planning policy and significant impacts on land use as a result of this option. There are some potential interactions with plan zonings within the Finglas Study Area; plan policies are broadly in support of electricity conveyance improvement and reinforcement development within the Finglas Study Area, however, it is possible that Option 3 would not fully accord with county planning policies, as new structures are proposed and there is a preference for new transmission connections to be underground. Perceived and actual impacts on land values may present significant constraints both in rural and urban areas. With careful routeing of OHL in consultation with communities and landowners, the risk of impacts would be reduced.

There is little scope for installing OHL in public roads however as there is for UGC so almost all of the land use would be 3rd party lands. New OHL corridors would require limited and temporary land take for construction, with short access tracks from local roads being used, wherever possible. Permanent land take would be limited to the footprint of the OHL pylons. There would however be a small number of significant impacts on particular parcels of land during the operational phase due to potential land use restrictions.

Landscape and Visual

There is a high risk of significant impacts on landscape and views as a result of this option. The potential for significant visual impacts in particular is identified and these would be permanent. Whilst sensitive landscapes, viewpoints and main settlements would be avoided where possible the length of this route and the high number of viewpoints which may be affected as a result means the risk of significant visual impacts remains high.

Cultural Heritage

There is a moderate to high risk of significant impacts on cultural heritage as a result of this option. There would be a combined impact of the potential to encounter unknown archaeological assets during construction and the potential to impact the setting of built heritage assets during operation. Of these two potential impacts, however, the more significant impacts would be likely to arise on the setting of heritage features during operation. The increased length of this option and the subsequent requirement of a greater number of pylons and the potential for impacting the setting of more historic assets means there is a higher risk of significant impacts from this option than for Option 1.

Noise and Vibration

There is a low to moderate risk of significant impacts from noise and vibration as a result of this option. The construction of a new OHL and associated pylons would be likely to generate noise and vibration, most notably from works for pylon foundations. This noise impact would be temporary. There may also be some low levels of noise associated with the OHLs during operation. There is likely to be a greater impact in the area of Woodland substation due to its rural nature.

Climate Change

There is a moderate to high risk of significant impacts to and from climate change as a result of this option. The OHL would be vulnerable to predicted future climate impacts associated with storms and winds and increased rainfall. Damage done could be difficult to repair as a result of increased flooding. This is a long-term risk and one that is predicted to increase over time. This would impact security of supply. This is an increased risk compared to option 1 because of the increased length of the route. The volume of material required to construct an OHL between Woodland and Finglas is significant and carries with it associated embodied energy. This would be greater than for Option 1.

6.4 Solution Option 4: New Belcamp to Woodland 400 kV Underground Cable (UGC)

Solution Option 4 involves a transmission network reinforcement to strengthen the network between the existing Woodland 400 kV substation in County Meath and the Belcamp 220 kV substation in North County Dublin. The reinforcement consists of a new 400 kV underground cable linking the Woodland 400 kV substation to the Belcamp 220 kV substation, and a new 400 kV busbar and 400/ 220 kV transformer at Belcamp.

Under Option 4, there are three key UGC solutions being investigated between Woodland and Belcamp, including:

- Option 4A: One 400kV circuit standard cable type (2.5m^2 Cu XLPE installed in flat formation in a 1.7m wide trench);
- Option 4B: One 400kV circuit alternative cable type (3m^2 Cu XLPE installed in flat formation in a 2.1m wide trench); and
- Option 4C: Two 400kV circuits consisting of one 2.5m^2 Al XLPE cable per phase, installed as two circuits in trefoil formation in a single 1.7m wide trench.

6.4.1 Assumptions and Limitations

Assumptions and limitations are as set out in Section 5.4.1 for Option 2.

6.4.2 Potential Impacts and Risk Ratings for Option 4

Biodiversity, Flora and Fauna

As for Option 2, potential effects on biodiversity during construction include:

- Temporary loss of terrestrial and aquatic habitat within the footprint of the Project to facilitate access roads and construction compounds;
- Disturbance, and temporary displacement of birds, mammals, amphibians, fish and other aquatic species from the working corridor and in close proximity to the proposed project;
- Temporary habitat loss/fragmentation of foraging habitat for mammals such as badger and bat; and
- Pollution of surfaces waters, leading to secondary effects on aquatic species.

Potential effects on biodiversity during operation include:

- Permanent loss of foraging, roosting, commuting and nesting habitat including fragmentation of wildlife corridors.

Disturbance to hedgerows, tree lines and associated species during construction is likely to be significant. There is likely to be temporary loss of hedgerow habitats as they tend to line roads and therefore would require removal for the installation of UGC. These habitats also have the potential to support roosting bat species and breeding birds, and therefore these species may restrict the timing of construction activities. During operation any swathe of land excavated to accommodate the cable will be reinstated, however hedgerows and trees will not be replanted directly over the cable route and therefore this represents a potential permanent habitat loss and fragmentation of wildlife corridors. Passing bays will be reinstated with species-rich hedge and verge mixes, therefore, hedgerow loss lining roads will be temporary until the replanted hedges become established. Any cable routes that are required to cross watercourses could potentially disturb or damage aquatic or riparian habitat in the construction footprint Trenchless crossing techniques for the larger rivers would have lower likelihood of impacts but there are still risks associated with this technique. Given the hydrological connections, there is potential for downstream impacts to European Sites.

During construction there is the potential for temporary habitat loss and disturbance impacts on wintering birds. During operation any swathe of land excavated to accommodate the cable will be reinstated however it is likely that hedgerows and trees will not be replanted over the cable route and therefore this represents a potential

permanent fragmentation to wildlife corridors. There is the potential for a ditch to be re-aligned at Belcamp which has the potential for loss of supporting habitat for amphibians.

During construction there is also the potential for disturbance impacts to wintering birds at foraging and roosting sites within the Belcamp Study Area.

Noise and human activity during construction is likely to cause disturbance to foraging and roosting wintering birds associated with the SPAs, if found to be utilising supporting habitat in the Belcamp Study Area.

There are fewer biodiversity constraints associated with Solution Option 4 than for Solution Option 3, as there is no potential for direct impacts upon Annex I and rare or protected species via collision risk. However, there is the potential for disturbance to species during construction and indirect impacts upon European sites in close proximity via pollution incidents. Therefore, there is a moderate risk of potential significant impacts to biodiversity. As Solution Option 4 is in closer proximity to European sites and the hydrological connection to these sites is shorter than for Solution Option 2, the risk of impacting upon these sites is higher for this Solution Option.

Colour Coding for MCA – Biodiversity

There is a Moderate risk of potential significant impacts to biodiversity in the absence of mitigation.

Biodiversity

Soils and Water

Geology, Soils and Groundwater

It is not anticipated that there would be significant impacts on geology, soils or groundwater during construction, given the assumption that the UGC routes would be mainly routed within public roads. The only potential risk area would be at the connection into Woodland substation and Belcamp substation where the UGC may have to cross third-party land due to physical constraints, such as the local road network coming into the Woodland substation.

There would be a slightly greater impact associated with this Solution Option than Solution Option 2, as the length of the UGC would be greater due to the increased distance between Woodland and Belcamp compared to Woodland and Finglas. This would require more trench excavations to accommodate the longer UGC. Therefore, there is a Moderate risk of potential impacts to geology, soils and groundwater.

There would be no anticipated impacts during operation.

Surface Water

As set out in Solution Option 2, there are a number of potential impacts on surface water during construction of an UGC. There would be no impacts predicted during operation.

During construction, generic impacts on surface water would include:

- Silty water runoff: surface water and dewatered groundwater containing high loads of suspended solids from construction activities. This includes the stripping of topsoil during site preparation, the dewatering of excavations and the storage of excavated material;
- Runoff being contaminated by a spillage or leakage of oils and fuels stored on site or direct from construction machinery; In the event of a spillage, there is a high likelihood of groundwater contamination. the slopes created by overbridging may increase the likelihood of surface water pollution from a spill;
- Change in the natural hydrological regime due to an increase in discharge as a result of dewatering. This may include changes to surrounding groundwater flow, or contaminated soil from previous land uses being disturbed causing pollutants such as heavy metals to enter ground and surface waters;

- Discharges of contaminated water from tunnelling and or excavations;
- High alkalinity run-off as a result of concrete works; and
- Potential for disrupting local drainage systems due to diversions required to accommodate the construction works.

Without mitigation, there is the potential for significant impacts to surface water receptors during the construction phase.

Specifically, for the UGCs, the crossing of watercourses, all of which have a hydrological connection to coastal SACs, presents a significant constraint for all UGC options.

Various techniques could be deployed, such as for larger rivers and canals, it is expected that crossings would be trenchless, possibly through the use of HDD; for smaller rivers and ditches, open-cut techniques are more likely, and these present the potential for greater impacts on the waterbodies as a result of impacts on riverbanks and the potential during construction for the cable trench to act as a conduit for silty water runoff into local rivers and streams. In addition, many of the local roads in the Belcamp Study Area have open drainage ditches alongside them, which are hydrologically connected to the larger waterbodies which are connected to SACs.

There is a risk to waterbodies from silt and spillages during the construction process, as there are 20 waterbodies in the Belcamp Study Area which may be crossed by UGCs at least once; there will be many smaller unnamed ditches and drains. There is also the potential for impacts on roadside ditches during construction. In addition, if the UGCs were to be installed in third party lands, there would generally be a greater level of open cut crossings, and so, risks would be higher.

The close proximity of the Mayne_010 water body immediately to the south of Belcamp substation presents a significant constraint. Therefore, there is a Moderate to High risk of potential significant impacts to surface water.

Flood Risk

The installation of the UGCs via a trench has the potential to disrupt surface water flows and provide a conduit to direct water to areas where flood risk may be increased, however since the preference is for cable sot be laid within the public road network this is not likely to be an issue in this case. There would be a requirement to cross several rivers and streams in the Belcamp Study Area, some of which may be susceptible to flooding. This could cause difficulties during the construction phase and increase the risk of flooding to and from the works, in addition to increasing the likelihood of silty water runoff.

The stockpiling of excavated material alongside a trench may also act as a 'bund' and cause either localised pooling of surface waters on land or a diversion into rivers and streams with insufficient capacity to receive it, which has the potential to cause localised flooding.

It is not anticipated that there would be impacts on flood risk during operation, as the UGCs will be installed in the road network, wherever feasible. Any crossings of rivers by 'cable bridge' technique could pose a flood risk. However, it is assumed at this stage that the crossings would be either in existing road bridges or installed under water bodies via open cut and trenchless techniques; cable bridges would not be required.

Colour Coding for MCA – Soils and Water Combined

There is a combined Moderate risk of potential impacts to soils and water, in the absence of mitigation.

Soils and Water

Material Assets – Planning Policy and Land Use

Planning Policy

It is acknowledged that there are more potential interactions with various plan zonings within the Belcamp Study Area than the Finglas Study Area. Zonings include the strategic reserve and major town centre/light industrial/technology zonings to the north of Dunboyne and moving east coming into the Fingal urban area, incorporating Dublin Airport and its environs, as well as housing and employment zonings around Swords and Malahide.

Plan policies support the principle of electricity conveyance improvement and reinforcement development within the Belcamp Study Area, and pro-actively favour UGCs, with all three councils having a policy seeking to ensure the undergrounding of cables (INF POL 50 in Meath CDP, Objective DMS139 in FDP, Policy SI32 in Dublin City CDP). Improving capacity to the outlying areas of the wider Dublin area is also beneficial for the increased emphasis on 'High Technology' development within the zonings present in the Belcamp Study Area. Potential impacts can be further minimised with appropriate routing alongside early engagement with Planning Authorities.

There is a Low risk of potential significant impacts in terms of planning policy.

Significant Planning Application/Proposed Developments

There is potential for limited impacts upon the various granted, ongoing or forthcoming planning applications within the Study Area, be they residential, employment or strategic infrastructure. In particular, the planned expansion of Dublin Airport would need to be taken into account in terms of the increased airport footprint and protection granted for inappropriate development in the airport environs, as well as the proposed Waste water Treatment Plant for the Greater Dublin Drainage project and the East West Distributor Road immediately north of Belcamp substation. However, in terms of siting and potential visual impact, these are substantially reduced with the assumption that routing will mainly follow public roads. Additionally, potential impacts to applications granted or currently being determined can be significantly mitigated through appropriate routing, and robust planning application monitoring can ensure forthcoming applications will be quickly identified and taken into account. The risk of potential impacts is considered to be low.

Land Use

There would be limited impacts on land use as a result of Solution Option 4, as the routing of UGCs would be along the road network, insofar as possible. There would be temporary impacts on the regional and local road network during construction, as carriageway closures would be required to accommodate the works. However, full reinstatement of all roads following the installation of the UGCs would ensure that these impacts would not be permanent. At the connections into Woodland and Belcamp, there is the potential that the cable would have to be installed across third party land. This would require a significant temporary land take during construction, but limited during operation, although a permanent wayleave and some restriction of agricultural practices above the UGC is likely. There would be lower real or perceived impacts on land values as a result of an UGC, however the restrictions on agricultural practices and the effective sterilisation of some land which may otherwise be developed, mean that impacts are likely to be similar to those for an OHL option.

Colour Coding for MCA – Materials Assets - Planning Policy and Land Use Combined

Therefore, for Solution Option 4, risks to planning policy and land use are considered to be low to moderate for, in the absence of mitigation.

Land Use and Planning Policy

Landscape and Visual

There would be some, but limited, impacts on landscape and views during construction of the UGC from temporary machinery and compounds. However, the use of the regional road network without requirement for third party

land for most of the route and the use of appropriate screening by fencing means the impacts would not be significant for the majority of the route.

There may be the potential for routing across third party land for the Woodland and Belcamp substation connections and this would result in the loss of some hedgerows. These effects could be permanent as it is EirGrid and ESB policy to not plant such vegetation over cables.

During operation, the UGC itself would have limited impacts on landscape and visual, once reinstatement is completed. There would likely be joint boxes along the route which would affect both but these effects are not expected to be significant.

Colour Coding for MCA – Landscape and Visual

Therefore, there is a Moderate risk of potential significant impacts to landscape and visual.

Landscape and Visual

Cultural Heritage (Archaeological and Architectural Heritage)

In general terms, the routing of an UGC presents a greater risk to unknown archaeology than the routing of an OHL. This is due to the greater extent of ground disturbance required for a construction working width and the excavation of trenches required to lay UGCs. The greatest impacts would be during construction and in particular the connections into the substations where there is the potential requirement to cross third-party land. This presents a greater risk to heritage assets, especially unknown archaeological assets, than installation in the regional road network. If any HDD is undertaken, sub-surface archaeological remains could be damaged or destroyed. If HDD is used, it is likely to be where there are significant physical constraints, such as roads, railways or waterways.

There would be limited impacts on heritage assets during operation. The joint bays required along the UGC route may affect the setting of some valued assets. However, in general terms, the UGC would not have a significant impact on heritage during its operation.

The potential impact of this Solution Option would be greater than that of Solution Option 2, as the length of the UGC, and therefore, the number of joint boxes required would be greater due to the increased distance between Woodland and Belcamp than that of Woodland and Finglas. There are also a number of heritage features in very close proximity to the west of Belcamp substation that present constraints.

Further investigation and surveys would be required to determine the exact nature of the cultural heritage assets in the Belcamp Study Area.

Colour Coding for MCA – Cultural Heritage (Archaeological and Architectural Heritage)

Therefore, there is a Moderate risk of potential significant impacts to cultural heritage assets, in the absence of mitigation.

Cultural heritage

Noise and Vibration

The construction of a new UGC would be likely to generate noise and vibration along the general construction working width, most notably from excavating trenches for cables, particularly in areas of hardstanding along roads. However, this would be temporary in nature. There would be no noise impacts anticipated during operation of the UGC, as this will be buried.

There is likely to be a greater impact in the area of Woodland due to its rural nature, but moving across toward Belcamp, the impact is not likely to be significant considering the current level of noise experienced in this area due to its close proximity to the major road network and Dublin Airport. The assumptions of the assessment are that the new UGC will be installed in the road network, wherever feasible. This will minimise the impact of construction related noise, due to a generally higher baseline noise level along road networks compared to rural areas. In addition, impacts will be temporary during construction only; it is assumed that appropriate screening will also be provided to reduce the potential for noise nuisance impacts to occur.

Colour Coding for MCA – Noise and Vibration

Therefore, , there is a Low to Moderate risk of potential significant impacts due to noise and vibration, in the absence of mitigation.

Noise and Vibration

Climate Change

Overview of Potential Impacts

In terms of the potential impacts of the four options, consideration is given to:

- Climate resilience: new energy infrastructure is a long-term investment and will need to remain operational over many decades, in the face of a changing climate; and
- Material use/embodied carbon

Climate Resilience

In terms of climate resilience, consideration has been given to the vulnerability of a UGC to potential impacts of climate change such as:

- Flooding; and
- Earth movement or subsidence caused by flooding or drought.
- UGCs are potentially vulnerable to earth movement and subsidence, as they are buried underground. UGCs are less vulnerable to flooding, winds and storms and subsequent transmission losses. Flooding is only considered a potential impact in terms of accessibility to UGCs for repairs, if required.

The shortest UGC from Woodland to Belcamp would be a straight line between the two and would be approximately 25km. It would not be possible to achieve this route given the existing constraints. It could be up to 43km long. Overall, there is a Low risk in terms of climate resilience as UGCs will be buried underground.

Materials Use

This Solution Option requires a single trench, approximately 2m wide, and three cables laid within concrete. The trenches are typically 1.5m deep, of which approximately 0.5m would be concrete, the remainder backfilled with material taken from the trench initially, wherever possible.

Taking an average potential cable route at approximately 32km, the UGC would require almost 100km of insulated cables. With a diameter including insulation of 128mm, this quates to approximately 1300m^3 of cable material and approximately 100,000m^3 of concrete. Whilst this would amount to a relatively small proportion of the ttal carbon budget for Ireland, this does present a greater risk with respect to embodied carbon than Solution Option 2 to Finglas because it is 30% larger. Since a reduction in greenhouse gas emissions is required, this would be a Moderate risk of a significant impact.

Colour Coding for MCA – Climate Change

Taking into account the resilience to climate change and the Low to Moderate risk of significant impacts to the UGC from climate change and the Moderate risk of significant impacts to greenhouse gas emissions as a result of the embodied energy in the materials proposed to be used, it is considered this presents an overall Moderate risk in terms of materials use and embodied carbon.

Climate Change

6.4.3 Summary of Environmental MCA for Option 4

A number of environmental factors are at a moderate risk of significant impacts as a result of this option; this is because the impacts are similar to those for Option 2 where many of the factors were considered to be at low to moderate risk, however this option is longer and so this increases the risk of such impacts. For soil and water, the greatest risks are as a result of open cut crossing of water bodies and constructing trenches in roads with roadside ditches alongside. These are most likely to occur in the more rural western part of the study area and are of a similar magnitude to those identified for Option 2. The risk to soil and water remains moderate. For all topics any risk would be during construction and therefore of a temporary nature. UGC are in accordance with local planning policy ambitions and are more resilient to the impacts of climate change. As a result, this option has an overall moderate risk of significant impacts on the environment.

More Significant/ Difficult/ Risk Less Significant/ Difficult / Risk

Table 6.12: Option 4 Constraints Risk Assessment

Topic	Risk
Biodiversity	Moderate
Soils and Water	Moderate
Planning Policy and Land Use	Low to Moderate
Landscape and Visual	Moderate
Cultural Heritage	Moderate
Noise and Vibration	Low to Moderate
Climate Change	Moderate
Summary	Moderate

Biodiversity

There is a moderate risk of significant impacts on biodiversity as a result of this option. In the absence of mitigation, the greatest effects on biodiversity would be during construction, where despite cables primarily being laid in public roads, there is potential for impacts on hedgerows, tree lines and aquatic ecosystems; other habitats and species may also be disturbed or fragmented during the construction phase and effects could be permanent in some cases. There is also the potential for permanent loss of mature trees along the route, especially where roads are very narrow or where the UGC is required to cross fields and hedgerows off-road. The increased length of this route compared to Option 2 results in an increased risk of significant impacts to biodiversity.

Soils and Water

There is a moderate risk of significant impacts on soils and water as a result of this option. The greatest impacts would be during construction . The risk to water bodies from silt and spillages during the construction process

would be moderate as there are a number of waterbodies in the Study Area which would need to be crossed; it would not always be possible to use existing bridges for this purpose and in these cases it would be necessary to go off-road and use other crossing techniques such as open cut trenches. There is also the potential for impacts on roadside ditches during construction. The risk is within the same category as for Option 2, despite being longer as the risks for Option 2 already take into account the potential for a large number of off-road crossing requirements which are more likely to be required along rural roads than in the urban areas close to Belcamp.

Materials Assets - Planning Policy and Land Use

There is a low to moderate risk of significant impacts on planning policy and land use as a result of this option. This option supports the ambitions of local planning policy for new transmission infrastructure to be underground where possible. There is the potential for the sterilisation of land where a UGC crosses third party lands, however that would be limited as a result of the preference to use public roads. This preference also reduces the level of land take required, except at the connections into Woodland and Belcamp: here there is the potential that the cable would have to be installed across third party land, requiring significant temporary land take during construction. This land take would be limited during operation, although a permanent wayleave and some restriction of agricultural practices above the UGC is likely.

Landscape and Visual

There is a moderate risk of significant impacts on landscape and views as a result of this option. The impacts would be greatest during construction, but this impact would be temporary in nature. During operation, the impacts would be limited. There would be visible joint boxes periodically along the UGC route, although these would be quite small. There may also be some requirement for third party land take and permanent loss of mature trees and hedgerows at points along the route and connections to the substations. The increased length of this option compared to option 2 increases the number of joint boxes and the potential for losses of mature trees and hedgerows along the route

Cultural Heritage

There is a moderate risk of significant impacts on cultural heritage as a result of this option. The impacts on cultural heritage from the UGC would be greatest during construction, both in terms of ground disturbance and impacts on the settings of heritage assets. The crossing of third-party lands at the substations presents a greater risk to heritage assets, especially unknown archaeological assets, than installation in the regional road network. During operation, there is also some potential for impacts on the setting of heritage assets from the joint boxes required along the UGC route. There are also a number of heritage features in very close proximity to the west of Belcamp substation that present constraints.

Noise and Vibration

There is a low to moderate risk of significant impacts from noise and vibration as a result of this option. Potential noise and vibration impacts from the UGC would be during the construction phase and would result from the trench works, particularly in areas of hard-standing, such as along roads. However, the baseline noise environment along roads is higher than that of rural areas, and as such, the impact is not likely to be significant. There may be a slightly greater impact at Woodland substation due to the rural nature of the area, but appropriate noise screening will be provided to minimise any noise nuisance. No impacts are anticipated during the operational phase, as the cable will be buried.

Climate Change

There is a moderate risk of significant impacts on and from climate change as a result of this option. UGCs are reasonably resilient to the impacts of climate change, such as storms, wind and rain, although changes in ground temperature and reduced moisture may have impacts on the efficiency of the cables. The volume of material required to construct an UGC between Woodland and Belcamp is significant and carries with it associated embodied energy. This would be greater than for Option 2.

7. Summary of Options Evaluation

7.1 Evaluation of Options

The appraisal of each of the solution options in the absence of mitigation is summarised in Table 7.1. From an environmental perspective, the highest risk solution option is Option 3, the OHL to Belcamp. This presents the highest risk to the greatest number of environmental aspects.

Table 7.1**: Options Assessment Summary**

Topic	Solution Option 1	Solution Option 2	Solution Option 3	Solution Option 4
Biodiversity				
Soil and Water				
Land Use (and Planning)				
Landscape and Visual				
Cultural Heritage				
Noise and Vibration				
Climate Change				
Overall Summary				

8. References

Department of Housing, Planning and Local Government (2018). River Basin Management Plan (RBMP) for Ireland 2018-2021

EirGrid (2015). EirGrid Evidence Based Environmental Studies - Study 3: Bats

EirGrid (2016a). EirGrid Evidence Based Environmental Studies - Study 5: Birds

EirGrid (2016b). EirGrid Evidence Based Environmental Studies - Study 10: Landscape and Visual

EirGrid (2016c). EirGrid Evidence Based Environmental Studies – Study 8: Noise

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Planning Inspectorate (2017). Advice Note Eighteen: The Water Framework Directive

Institute of Air Quality management (IAQM) Guidance on the assessment of dust from demolition and construction, 2014

Rose, P. and Baillie, S. (1992). The effects of collisions with overhead wires on British birds: an analysis of ringing recoveries. British Trust for Ornithology Research Report 42, 1-227

Directives and Legislation

Habitats Directive (92/43/EEC)

European Communities (Natural Habitats) Regulations (S.I. 94 of 1997), as amended

European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011)

Birds Directive (2009/147/EC)

Wildlife (Amendment) Act 2000, as amended

European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003)

European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. No. 272 of 2009)

European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010)

European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010)

European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011)

European Union (Water Policy) Regulations 2014 (S.I. No. 350 of 2014)

The Floods Directive (2007/60/EC)

EU (Assessment and Management of Flood Risks) Regulations 2010

Appendix A. Constraints Maps

Map Number	Title
321084AE-MAP-001	Biodiversity Constraints
321084AE-MAP-002	Geology Constraints
321084AE-MAP-003	Surface Water Constraints
321084AE-MAP-004	Groundwater Constraints
321084AE-MAP-005	Landscape and Visual Constraints
321084AE-MAP-006	Cultural Heritage Constraints
321084AE-MAP-007	Subsoil Constraints
321084AE-MAP-010	Cumulative Constraints Weightings (Heatmap)

Appendix B. Datasets

[PLACEHOLDER – LIST OF DATASETS (AND SOURCES) USED IN PROJECT MAPPER TO BE INSERTED HERE]

Appendix C. Heat Map

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[i] Source: https://www.npws.ie/protected-sites/nha, accessed 10/12/2019.